THE
RAILWAY GAZETTE

Price: Two Shillings | FRIDAY, MARCH 13, 1959 | Annually £5 by post

THE RAILWAY GAZETTE
A Journal of Management, Engineering and Operation
INCORPORATING
Railway Engineer · TRANSPORT · The Railway News
The Railway Times · Herapath's Railway Journal · RAILWAY RECORD.
RAILWAYS ILLUSTRATED · ESTABLISHED 1835 · THE RAILWAY OFFICIAL GAZETTE

33, TOTHILL STREET, WESTMINSTER, LONDON, S.W.1.

Telephone: WHitehall 9233 (20 lines) *Telegrams: "Trazette Parl London"*

BRANCH OFFICES

GLASGOW: 139, Bothwell Street, C.2 . . . . . *Central 4646*
NEWCASTLE-ON-TYNE: 21, Mosley Street . . *Newcastle-on-Tyne 22239*
MANCHESTER: Century Insurance Building, St. Peter's Square *Central 7667-8-9*
BIRMINGHAM: 90, Hagley Road, Edgbaston . . *Edgbaston 2466*
LEEDS: 70, Albion Street . . . . . *Leeds 27174*
BRISTOL: 20, Victoria Square, Clifton . . . . . *Bristol 33873*

Annually £5 by post Single copies, Two shillings
Registered at the G.P.O. as a newspaper. Entered as second-class matter in U.S.A.

Editor : B. W. C. Cooke, Assoc. Inst. T.

Vol. 110] FRIDAY, MARCH 13, 1959 [No. 11

CONTENTS

Feast and Famine for Wagon Builders

THE view that the old conditions of "feast and famine" for private builders in Britain of carriages and wagons were likely to reassert themselves when construction for British Railways under the modernisation plan was completed, was stated a year ago by Mr. L. B. Alexander, London Manager & Special Director, Metropolitan-Cammell Carriage & Wagon Co. Ltd. He expressed this view in a paper to the Institute of Transport, Metropolitan Section, in London. Last Wednesday, in a paper to the British Railways, Southern Region, Lecture & Debating Society, the subject of editorial comment on page 293, he stated that wagon famine had already set in. In 1957, the industry produced 47,000 wagons for British Railways. In 1958, 26,000 wagons were ordered. This year, the total ordered from the industry by the British Transport Commission is a little over 100. The need for new wagons is restricted in view of reduced traffics and the existing surplus of wagons. The turnround of wagons will be and is being reduced by quicker running speeds resulting from diesel and electric traction and re-signalling, and by the re-organisation of goods services which involves shorter transits, achieved by closing of small stations and sidings, concentration of traffic on larger depots, and use of new and re-equipped yards. It seems that most of the smaller number of wagons required are to be built in British Railways works. There has also been a falling off in demands for wagons by some railways overseas. As Mr. Alexander has pointed out, demands fluctuate, and orders from overseas may increase in the not too distant future. Sir David Eccles, President of the Board of Trade, stressed at the Institution of Locomotive Engineers' luncheon last month that the vitally important locomotive export trade depended largely on the home railways affording a proving ground for the products of private industry. The same considerations apply to carriages and wagons. The present shrunken traffics of British Railways may well increase in a year or so. A good many wagons of special types are being built. It is to be hoped that orders for a reasonable proportion of the new wagons required for the nationalised railways should be placed with private builders in this country.

Mr. J. R. Hammond

AN excellent choice has been made in the selection of Mr. J. R. Hammond, Assistant General Manager (Modernisation), Western Region, British Railways, to succeed Mr. K. W. C. Grand, as General Manager of that region. Trained under the late Mr. Raymond Carpmael, then Chief Engineer, Great Western Railway, Mr. Hammond's career has been closely connected with new works and major engineering projects in many parts of the system. His administrative knowledge has been greatly broadened by experience gained as Personal Assistant to Sir Allan Quartermaine, then Chief Engineer, Western Region. As a result of holding that office, a great deal of the skill, technical knowledge, administrative ability and understanding of human relationships displayed by Sir Allan Quartermaine has been absorbed by Mr. Hammond. All these traits, coupled with high personal qualities, and the respect and prestige he already enjoys, are essential to the position of high responsibilty he now assumes. Mr. Hammond's wide experience has been linked with planning for the future, by the appointment he now relinquishes: Assistant General Manager (Modernisation). He is well fitted to maintain the high standards and traditions set up by past General Managers and followed by Mr. Grand since 1955.

Reduction in South African Railways Deficit

SOUTH African Railways have estimated a deficit of only £32,320 for the financial year 1959-60, during which expenditure is calculated at £193,600,000, to be almost equalled by revenue. This compares with a deficit of £7,670,000 for the year ended March 31, 1959, which is caused by a drop in high-rated traffic and the fact that increases in tariffs introduced during the year were not in force over the whole period. Announcing this to the South African House of Assembly last week, the Minister of Transport, Mr. B. J. Schoeman, stated that capital expenditure during 1959-60 would be £90,900,000, of which £67,000,000 would have to be found by loans. The mission sent overseas to study methods of financial control of State-owned and privately-owned railways had submitted its report, and he hoped to begin on practical application of its recommendations during the coming financial year. The scheme to build a railway from the Witbank coalfields through Swaziland has been abandoned, but the S.A.R. are prepared to build a line into Swaziland to help the pulp mill and mines in that territory.

Diesel Traction in East Africa

A REPORT drawn up by the East African Railways & Harbours Administration at the request of Mr. J. R. Farquharson, the General Manager, recommends the introduction of diesel-electric traction on the 257-mile Nairobi-Nakuru-Kisumu section in Kenya. Although measures have been taken successfully to improve the capacity of this line for handling present traffic, the limit with steam traction is expected to be reached in 1962 between Nairobi

and Nakuru, where water for locomotives is scarce. The final conclusion is that 15 1,800-2,000-h.p. and eight 1,100-1,400-h.p. diesel-electric locomotives should be introduced between Nairobi and Nakuru, and 14 of the second category between Nakuru and Kisumu. The total expenditure is put at some £3,379,000 The report looks ahead to the possibility of conversion to electric traction, depending on the continued increase in traffic over the section, and the progressive replacement of all E.A.R. steam power over the next 20 years.

Overseas Railway Traffics

EAST African Railways & Harbours approximate railway revenue for January, 1959, was £1,866,000, compared with £1,767,000 in January, 1958, an increase of £99,000. There were substantial increases in receipts from all services with the exception of passenger and other coaching traffic. Revenue from the inland marine services was some £14,000 greater than that for January, 1958, due mainly to heavy movements of cotton from Uganda. Operating revenues of the Canadian National Railways for January amounted to $55,676,000. Expenses, taxes, and rents totalled $60,422,000, resulting in a net operating deficiency for the month of $4,746,000. In January, 1958, operating revenues were $54,341,000; expenses, taxes, and rents were $60,078,000, and net operating deficiency was $5,737,000. Canadian Pacific Railway revenue for January amounted to $37,151,891 compared with $36,115,350 in January, 1958. Railway expenses were $36,847,038 ($35,536,994), resulting in net earnings of $310,853 ($578,356). Figures received from the Midland Railway Company of Western Australia Limited show that estimated road and railway receipts for November, 1958, were £A62,631 (against £A67,384 for November, 1957). Aggregate receipts for the five months July-November amounted to £A333,128 (£A357,370).

Southern Intensifies P.R. Effort

MR. P. A. WHITE's second report to travellers on the South-Eastern line of the Southern Region of British Railways discusses the temporary timetable to be introduced next month on that line. In accordance with this, some departure times will be put back, and schedules of down trains will be adjusted. These changes are being made to mitigate delays likely to be caused by closure of the main Newington lines while improvements are in hand. The delays are predictable because they will tend to occur over a fixed area. Others caused by work up and down the line are not so accurately foreseeable and thus cannot be similarly covered. Adjustments to train timings cost time and work, and the Region deserves praise for a positive effort to please the public. Nevertheless, it may be that, when initial public gratification has worn off, an outcry will assert that modernisation has been used as an excuse to introduce slower trains. Complaints on Kent Coast services are varied and not all are attributable to delay: it might be wiser to keep to the policy of telling the customer what is wrong rather than to try to camouflage the trouble.

Kent Coast Electrification Progress

WORK on the electrification of the 78 route-miles beyond Gillingham, which comprises phase 1 of British Railways, Southern Region, Kent Coast electrification scheme, for completion next June, is on schedule. The lines are from Gillingham to Ramsgate via Faversham; the branch from Sittingbourne to Sheerness; and from Faversham to Dover Marine. Twenty-three substations have been built for phase 1 and the majority are ready for use. Almost all the 87 miles of cable has been laid, and some 95 per cent of the work in connection with the laying of 160 miles of conductor rail is completed. On the portion of line already electrified the major works were between Shortlands and Swanley. These consisted mainly of earthworks and bridge reconstruction to improve operation through junctions, and increase running speed of trains. Eight automatic signalboxes have been built between Brixton and the coast, replacing 28 manual boxes. The first was brought into use at Shepherds Lane, Brixton, on March 8, and controls colour-light signalling on routes in the Brixton, Herne Hill, and Loughborough Junction area.

The Transport Situation in Europe

THE report of the European Ministers of Transport for 1958 shows that the marked fall in heavy bulk freight in 1958 adversely affected the railways, more particularly those which depend largely on this traffic. As a result, most railways moved less freight than in 1957. Disregarding the special situation of countries in process of development, statistics show that this fall varied between 8 and 12 per cent. France was an exception, with a decline of only 1·5 per cent, probably because industrial production was still rising. Investment estimates for rolling stock and electrification in 1957 were almost carried out. These amounted to $671,000,000, an increase of 31 per cent compared with 1956, to which must be added $192,000,000 (a decrease of 8 per cent) for the modernisation and development of permanent way equipment other than that relating to electrification. The number of steam locomotives fell by 5·3 per cent. The report comments that if the gradual replacement of steam traction continues at the same rate, conversion to electric and diesel traction will be almost completed in 15 years.

A Motorman's Serious Lapse

THE collision at Maze Hill on July 4, 1958, arose from a motorman who had observed the distant signal to be against him nevertheless passing the well sited adverse home signal at speed and applying the brakes only on seeing the obstruction. He could not remember having seen this signal at all, and Brigadier C. A. Langley, whose report is summarised in this issue, feels unable to offer an explanation for this serious lapse on the part of a steady and capable man, well spoken of by his superiors. He makes reference, as he had done in his Annual Report for 1957, to the British Transport Commission decision to study with the help of scientists the problem of failure to observe signals, of the results of which there have been reminders in the last year or two, although the number of accidents so caused has for some time been declining. The British Medical Association is to deal with the question at the Commission's request. Its investigations are expected to last two years. The layout at Maze Hill, with its facing siding connections, is a relic of the right-hand train running which obtained from, it is believed, 1849 on the line to Greenwich, extended to the North Kent line at Charlton in 1878. This unusual working lasted until 1901, when, in connection with new works below London Bridge, normal left-hand running was re-established.

R.E.N.F.E. Extending its C.T.C.

THE success attending the 30 miles of C.T.C. on the Ponferrada incline in Northern Spain brought into service in 1954, under very onerous local conditions, led the management of the R.E.N.F.E. to decide on a programme of extensions, covering some 770 miles, to be completed by the end of 1962. Of these 173 miles already are in operation, as recorded elsewhere in this issue. These installations accompany much other work, such as duplication, bridge strengthening and permanent way improvements, in many places involving complete renewal. Industry, much of it of the heavy class, is expanding rapidly in the North, while in the North-East and along the East Coast an increasing volume of agricultural traffic demands better facilities. In Andalusia other considerations apply. C.T.C. and other signalling improvements afford a means of offering better services, both goods and passenger, with minimum outlay on operating staff, enabling traffic to be directed to the best advantage and unnecessary delays avoided, especially vital where single lines are involved.

Train Braking from High Speeds

THE possibility of high speeds with heavy trains handled by Deltic Co-Co 3,300-h.p. diesel-electric locomotives was shown last week by tests conducted by British Railways, Eastern Region, with the prototype of this class transferred from the London Midland Region. Twenty-two of these locomotives, each with twin Napier Deltic 18-cylinder engines and Westinghouse braking equipment are being supplied by the English Electric Co. Ltd. to the Eastern, North Eastern, and Scottish Regions for work on the East Coast Route. The tests were on the Great Northern main-line between Kings Cross and Grantham with a 10-coach train including dynamometer car, weighing 355 tons. As recorded elsewhere in this issue, stops from 60, 90, and over 100 m.p.h. were achieved in distances smaller than would be needed with a comparable steam-hauled train. To facilitate visual checks on the braking distances recorded in the dynamometer car, brakes were not applied until the locomotive was level with signal posts. The Eastern Region will continue to gain experience with the prototype Deltic locomotive preparatory to commencement in 1960 of deliveries of the production version.

So Bracing for the Younger Generation

THE poster by John Hassall, issued by the Great Northern Railway in 1908, of the invigorated fisherman at Skegness with the slogan "Skegness is so Bracing," has given pleasure to the thousands who have seen it displayed in stations and on advertising sites, besides achieving its purpose of attracting traffic. Elsewhere in this issue are reproduced two new resort posters recently produced by British Railways, Eastern Region, a successor of the G.N.R. One of Skegness, by W. M. Fryer, in a style reminiscent of Hassall, depicts a considerably younger successor to the fisherman. Contrasted with it is a poster of Southend by R. M. Lander, in contemporary style. To repeat the Hassall motif is an ingenious step which deserves success. The standard of British railway posters has been high for many years, but few have become classics. Among the latter are the Southern Railway "South for Sunshine" poster, of the small boy passenger conversing with a fireman, and "Lucky Dogs" issued by the Great Western Railway before the first world war.

W. Cyril Williams

OVER 35 years of a vigorous and colourful career, which took him to railways all over the world, the name of Cyril Williams has become almost a synonym for the Beyer-Garratt locomotive. The widespread use of these locomotives on so many railways under such varied conditions has been due in very large part to his tireless and eloquent advocacy and his indomitable energy and enthusiasm, based on an absolute conviction of the merits of this form of motive power. But Cyril Williams was far more than a very able and successful salesman of locomotives, and his death on March 5, a few weeks before he would have reached his seventieth birthday, will leave a gap in a very wide circle.

He was essentially a highly qualified and skilled engineer who, from his earliest days in South Africa, was insatiable in his acquisition of knowledge relating to the mechanical side of railways. His interest was always practical and his memory was prodigous. At a very early stage in his career, while on the staff of the South African Railways, he contributed to this journal, a practice he maintained for many years after he had come to England in 1923. In that year he joined Beyer Peacock & Co., Ltd., and took premises in Abbey House, Victoria Street. He occupied the same room until five years ago, when he retired from his position as Sales Director while remaining on the Board of the company, the London Offices of which shortly afterwards were moved to Locomotive House.

From the time Cyril Williams joined Beyer Peacock & Co. Ltd., he set himself the task of promoting the sale of the Beyer-Garratt locomotive—no easy matter in the early years. The company enjoyed a considerable reputation as steam locomotive builders, but it was Cyril Williams who took a major part in the successful application of the Garratt and who travelled practically all over the world to obtain first-hand experience of railway conditions and how their motive power problems could be met. In doing so he acquired not only his extraordinary detailed knowledge of railways overseas, but an enormously wide circle of friends and acquaintances.

Apart from railways, his other great enthusiasm was for the British Commonwealth, for the ideals and merits of which he was a great advocate and supporter. He gave freely of his time and wide experience to the Institution of Locomotive Engineers. He was a staunch Mason, a warm-hearted and generous friend to many. He was a "personality" in a time when they are becoming all too few.

Roads in the Commons

ON the instigation of the Opposition, the House of Commons is to debate the roads programme next week on the Supplementary Estimates. These provide for an increased vote over the original estimate of some £12 million, of which approximately £11 million is for additional expenditure on new construction and major improvements and £1 million is a contribution to the British Transport Commission in respect of its inherited liabilities for maintenance of bridges and level crossings. The Government has agreed to contribute £1 million towards the latter this year, and £2 million next. In view of the expansion in the roads programme which makes these additional votes necessary it may seem surprising that the Opposition has chosen this subject for debate. It was recently announced by Mr. Harold Watkinson, Minister of Transport & Civil Aviation, that actual expenditure on the roads programme would be £40 million for the year ending March 31, 1959, and £50 million next year, and it would then level off at £60 million a year.

This is a considerable increase on earlier expenditure and represents the execution of the schemes authorised during recent years. Should the Opposition merely contend that this expenditure was still inadequate, it would be inviting criticism of its own failure, as while Labour was in office from 1945 to 1951 expenditure on new construction was negligible. It is more likely that the Opposition argument will be that, with unemployment running at a high level, with unused capacity in the steel industry, and other materials besides equipment available, a better opportunity for providing the roads to meet modern traffic needs is now provided than at any time since the war.

That this is the Labour case is shown by a motion on the Order Paper for debate last Friday. The motion was a victim to the influenza epidemic as its proposer was ill and could not move it. It welcomed the increase in authorisations and expenditure but considered the current programme inadequate for the growing volume of traffic and called upon the Government to undertake a long-term programme, with special regard to the relief of urban congestion by the provision for urban motorways. It urged the Government to give special consideration to schemes in areas of high employment. To this an amendment was tabled by back-benchers on the Government side supporting the current programme and the special road schemes being carried out in areas of unemployment. This reveals the different approaches which Government and Opposition spokesmen will make during next week's debate.

Even with the motorways under construction and planned, and the large schemes under way in the London and other urban areas, the yearly increase of half-a-million vehicles coming on to the roads is adding faster to congestion than the latter is being relieved. To embark on a vast programme of road building is not enough. What is needed is a long-term plan based on a re-assessment of future traffic needs and with full regard to the wider aspects of town and country planning, industrial location, and land use. It is equally important that the roads programme be planned in relation to existing transport

facilities and their use. The British Transport Commission, at the Minister's request, is undertaking a re-assessment of the railway modernisation plan in the light of recent railway traffic trends. An inquiry into road transport should be made before the present programme, which so far has been largely on an ad hoc basis and seems to have been influenced by special pleading of pressure groups and by political considerations, is expanded.

Furthermore the information available on road, compared with rail, traffic is comparatively scarce. More information is needed, particularly on the origin, destination, and economics of road traffic. With railway capacity available, road congestion increasing, and, with it, the toll of road accidents, it is essential that those responsible for authorising capital investment in transport should consider these matters. The demands of traffic are such that modernisation of both the railways and of the roads is necessary, but neither should be pursued without regard for the other.

A helpful presentation of this point of view is made in a new Fabian research pamphlet entitled "What Shall We Do About the Roads?" by the Secretary General of the Fabian Society, Mr. W. T. Rodgers. He fails to give a final answer to the question he puts, but at least the problem is presented and a plea made for greater knowledge of traffic habits and of the economics of road improvement before proceeding haphazardly with new construction. The proposal is put forward tentatively that there should be a roads authority on the pattern of British Railways and within the British Transport Commission. It is hard to believe that this is the solution to the roads problem. The Commission has enough to do—some people argue that it has too much. The roads are not analogous to railways. They serve many purposes other than the movement of people and goods. Operation of transport along them is separate from their maintenance.

Aids to Railway Management

MANY steps taken and matters considered by the management of British Railways were mentioned by Mr. David Blee, General Manager, British Railways, London Midland Region, in his comprehensive paper, "Aspects of Railway Management" read last Monday to the Institute of Transport. The paper provoked a discussion of more than usual interest. Space does not allow mention of more than a few of the points made by the author. Most of them were instanced in the plans made, and action taken to implement these, in the London Midland Region.

One of the most important objectives of railway management, he stated, should be action to achieve viability by introducing more modern techniques and physical assets in the short term, *i.e.*, brought to fruition within the next four or five years. The London Midland Region plan to develop goods traffic, now in active course of implementation, was developed on this basis. (The plan was outlined in our February 6 issue.) Concurrently, study of a plan for passenger services, he added, was in hand in the Region. It involved inter alia closing of some 300-400 stations to passenger traffic.

In outlining the scheme to electrify the Western Division of the Region at 25 kV. a.c., he pointed out that the virtually rebuilding of a railway in full operation necessitated interference with traffic on a scale calling for careful appraisal of the possible diversions, with risks of delays in service, over a period which might be as long as the very five years by which the viability of the railway could be judged. Conversion of the Western Division main line necessitated, as between Crewe and Euston, ballasting of 1,560 single track-miles of lines; 728 bridges needed to be lifted; nearly 14,000 yd. in tunnel had to be widened or opened out; some 1,400 single track-miles would require re-signalling and track circuiting; and overhead equipment for some 1,700 single track miles, including sidings, needed to be erected. All this was additional to the contract and supply problems.

Emphasising the importance of good design Mr. Blee pointed out that in his Region a prototype prefabricated station had been built on the Styal line, near Manchester, from which a standard station had been developed. Advantage had been taken of new materials and structural techniques. The panels were of stressed skin construction, the outer skin of fibre glass, and the frame of extruded aluminium. The advantages were speed of erection and ease of maintenance. The design would give the lines to be electrified a unified appearance.

As to traffic costing as an aid to management, the larger the organisation and the more varied its fields of activity, the more difficult the clarification of costings tended to become. The need was to know a great deal about the economics of individual functions and the "profitability" of services and traffics. The management no longer could be satisfied with figures of the overall financial results of its Region, or even of its divisions, if such were available. An example was the passenger services of the London Midland Region. Overall figures showed that they were not paying their way, yet detailed analysis had demonstrated that individual services ranged widely between the highly profitable and those which lost heavily.

Discussing the fundamentals and advantages of work study, he stated that global figures were notoriously unreliable, but that experience had shown that for every man employed on a job before work study was applied, £50 a year at least could be saved, if the redundancy problem could be dealt with. The London Midland Region had some 170,000 staff, and on this basis a saving due to work study applications of some £8 million to £9 million a year was possible. In the Chief Civil Engineer's Department 3,100 men were now working under incentive bonus conditions on the maintenance of the permanent way and in depots, that is, approximately two-thirds of the original manpower employed on this kind of work. The men's wages had risen by 25-30 per cent. A method study of the movement of materials between creosoting, track-prefabricating, and central materials depots showed that re-organisation of the work was possible. To date, two depots had been closed, with a staff reduction from 202 to 126. The same amount of work was still being done.

In April, 1957, the British Railways Productivity Council, including the trade union representatives, agreed to a close examination of goods train working, using work study principles. The Barrow-in-Furness area of the London Midland Region was selected. It was found, largely by re-arrangement of workings to eliminate the idle time shown up by the investigation, that enough savings could be made to justify bonus payments of about 30 per cent to grades such as drivers, firemen, and shunters, engaged in moving freight traffic. The simple requirement to earn maximum bonus was that trains should arrive on time.

It was, he concluded, a healthy thing for railway management constantly to remind itself that all the great technical resources of the undertaking, professional skills, operating techniques, and commercial activity really only existed for the simple purpose of producing at an economic cost two products: a seat-mile and a ton-mile of such a quality that with adventurous salesmanship they could be sold in large volume and at a reasonable margin of profit.

A.C. Electrification in Argentina

THE Argentine State Railways, which recently decided in principle on a.c. electrification of passenger working on part of the 5-ft. 6-in. gauge General Roca Railway, ask for comments and suggestions from firms specialising in this work, preparatory to calling for tenders. The project is for conversion of some 82 miles of route and 190 miles of track from the Plaza Constitución terminus at Buenos Aires and is reported to include the line to La Plata. Conversion is expected to be at 25 kV., 50 cycles, which probably will be standard for future electrification. The peak power requirement is calculated at 100,000 kW. If adequate power cannot be obtained from the national grid, it may be necessary to build a power house specially.

The General Roca, which is the former British-owned Buenos Ayres Great Southern Railway, at present includes no electrified section. There seems to be no intention to link the General Roca with other electrified lines, but conversion now planned could be the nucleus of a.c.

electrification of all main lines radiating from Buenos Aires. The intention is to electrify passenger services and to operate these with multiple-unit trains. Plans provide for 38 trains an hour, with a maximum formation of 10 cars, conveying 60,800 passengers an hour. Two-car or three-car units have been recommended, developing 88 m.p.h. Vehicles are required to be about 83 ft. long, of a single class, to accommodate 90 seated and 70 standing passengers, with four doors on each side and floors at platform level. As with multiple-unit stock built in recent years for electric lines in other countries, importance is attached to saving weight.

The project involves a good many associated works. Re-signalling is understood to be required of sections to be electrified. Depots are to be built near Temperley and Quilmes (near Buenos Aires). Plaza Constitución, Temperley, and La Plata Stations are to be remodelled, with raising of platforms at stations. Two additional tracks are to be provided from Plaza Constitución to Empalme Pavon, with a flyover at the latter point. Many alterations in track layout are planned. The terrain generally is not difficult, and most of the civil engineering work is required for traffic purposes.

Problems of the Carriage and Wagon Builder

THE point of view of the manufacturer of rolling stock was ably presented by Mr. L. B. Alexander, London Manager & Special Director, Metropolitan-Cammell Carriage & Wagon Co. Ltd., in a paper given last Wednesday, and directed not, as he explained, to engineers, but to those who requisition rolling stock. He was addressing the British Railways, Southern Region, Lecture & Debating Society. In the course of his lecture he illustrated a number of Metropolitan-Cammell products.

The carriage and wagon industry in this country, he pointed out, was in the past built up largely on its export trade. Export figures for completed vehicles had been running at some £8,000,000-£10,000,000 a year, and for components and spare parts sometimes up to as much as £16,000,000.

There were two main factors, he stated, which affected both carriages and wagons. The first was that conditions of service necessitated a vehicle strength and safety beyond what was necessary for its own weight and load. The second was that railway charges depended on writing off passenger vehicles over at least 30, and goods vehicles over 40, years. Only part of the fleet would look modern, unless, originally, "those concerned hit on some unusually inspired design." He went on to give a warning against attempts to be ultra-modern in following mere fashion, which very soon became outmoded.

Except for British Railways since the last war, railways in general did not order their rolling stock regularly. A year ago, he had expressed the view that when the British Railways modernisation plan had been completed, there would probably be a return to the old conditions of "feast and famine." The famine had already set in. In 1957 the industry produced 47,000 wagons for British Railways. In 1958 26,000 were ordered. This year the total ordered from the industry was 112. To illustrate the fickle nature of foreign markets he instanced the fact that in 1954 the Indian Railway Board, which had been ordering an average of 2,000-5,000 wagons a year from abroad, stated that all wagons in future would be built in India, and that the Board had placed pilot orders on Indian firms. In the following year India ordered from abroad, with financial aid from the U.S.A., but also on its own account, over 30,000 wagons. Another limiting factor was the way in which each successive order differed in type from the preceding one, because of varying track and loading gauges and traffic, climatic, and other requirements. The industry had to live on many comparatively small orders. Real mass production did not apply, and wagon orders for 2,000 and upwards were exceptional.

Discussing passenger vehicles, he pointed out that the rubber sprung bogie was a comparatively recent development. London Transport Executive had already tried out the design successfully for three years. It showed definite gains on quietness and in damping out vibrations, and with the absence of wearing parts there was considerable hope of reduction in maintenance costs. Scientific methods of measurement were now at last being applied to bogie movements on the track.

Suburban electric stock, Mr. Alexander stated, called for a high degree of carriage building art in stowing the electrical equipment, often under the coach, so as not to encroach on passenger space. It also required close collaboration with the electrical contractors in the builders' shops. The South African Railways suburban electric stock supplied by Metropolitan-Cammell was a good illustration of a complex work of this kind. As to the diesel railcars now being supplied in large quantities to British Railways, Metropolitan-Cammell had taken a large share in the programme. Altogether there were plans for purchase of 4,600 railcars, and over 2,400 of these were now built and in service. These cars were proving successful in all the Regions. They were illustrated as outstanding products, as were the two prototype main-line coaches built for British Railways and described in our issue of February 8, 1957. He felt that as regards the colour schemes, the new stock built at Eastleigh works for the forthcoming Kent Coast electric services ran the two main line prototypes very close.

British Transport Commission Traffic Receipts

THE only receipts from British Transport Commission carrying activities for the second four-week period of the year to show an increase compared with Period 2 of 1958 were passenger receipts from ships. British Railways and London Transport Underground receipts were very slightly less than last year's figures. L.T.E. road services at £3,817,000 were £600,000 less than a year before. Both this decline and that of the provincial and Scottish bus traffics are in accordance with recent trends. The weather during Period 2 on the whole was favourable for excursion traffic, and in view of the efforts made to foster this, British Railways passenger receipts might have been expected to be larger. Business travel by train may have been affected by a larger amount of motoring than usual for the time of year, because of the good weather. It is impossible to say whether the recession in industry caused a drop in passenger receipts, railway and road, more particularly in the North and Midlands. Excursion and shopping travel may have suffered.

—	Four weeks to February 22		Incr. or decr.	Aggregate for eight weeks		Incr. or decr.
	1959	1958		1959	1958	
	£000	£000	£000	£000	£000	£000
Passengers—						
British Railways ..	8,209	8,248	− 39	16,609	16,506	+ 103
London Transport:						
Railways	1,799	1,800	− 1	3,650	3,623	+ 27
Road Services ..	3,817	4,417	− 600	7,788	8,753	− 965
Privincial & Scottish buses	3,922	4,007	− 85	7,914	8,019	− 105
Ships	206	184	+ 22	468	417	+ 51
Total Passengers ..	17,953	18,656	− 703	36,429	37,318	− 889
Freight, Parcels & Mails—						
British Railways:						
Merchandise & livestock	7,808	8,749	− 941	14,893	16,907	− 2,014
Minerals	3,542	4,013	− 471	6,990	7,927	− 937
Coal & coke ..	10,486	11,141	− 655	20,203	21,692	− 1,489
Parcels, etc., by passenger train..	3,926	3,932	− 6	7,676	7,676	—
Total Freight British Railways	25,762	27,835	− 2,073	49,762	54,202	− 4,440
Others*	4,083	4,195	− 112	7,944	8,131	− 187
Total Freight, Parcels & Mails	29,845	32,030	− 2,185	57,706	62,333	− 4,627
Total	47,798	50,686	− 2,888	94,135	99,651	− 5,516

* Road haulage, ships, and inland waterways freight.

The most disquieting feature of receipts for Period 2 is

merchandise and livestock by British Railways. At only £7,808,000 receipts from these were £941,000 below the corresponding figure for 1948, which itself represented a considerable decline. For the first eight weeks of 1959 these traffics already are more than £2 million below last year's total for the two periods. The disappointment is the greater because of the efforts made by the Regions to develop traffic. A decline in despatches by trade and industry, because of reduced business, and an increase in "C" licenced transport seem to be the main causes. Mineral traffic receipts, as expected, continue to show a decline. The outlook for minerals, which tend to reflect quickly any increased activity in the steel industry, is more cheerful than for coal class traffics. These continue much below the already reduced figure for last year and there seems to be no prospect of improvement. Coal and Coke receipts for the first two periods of the year are nearly £1,500 million less than a year previously. Receipts from the other carrying activities were only £112,000 less than for Period 2 of 1958. Most of these are derived from British Road Services and other road transport. In view of the meagre merchandise traffics of British Railways, the drop of £112,000 is less than might have been expected. No separate heading is now shown in *Transport Statistics* for receipts from cartage and delivery services. These are included under the appropriate heading, and the 1958 totals also adjusted for purposes of comparison.

The total traffic receipts of the Commission for the first eight weeks of 1959 are £5·5 million less than a year before.

BRITISH TRANSPORT COMMISSION TRAFFIC RECEIPTS PERCENTAGE VARIATION 1959 COMPARED WITH 1958

	Four weeks to February 22	Eight weeks to February 22
British Railways—		
Passengers	− 0·4	+ 0·6
Parcels	− 0·1	—
Merchandise & livestock	−10·7	−11·9
Minerals	−11·7	−11·8
Coal & coke	− 5·8	− 6·5
Total	− 5·8	− 6·1
Steamships (passenger)	+11·9	+12·2
British Road Services, Inland Waterways and Ships (cargo)	− 2·6	− 2·2
Road Passenger Transport, Provincial & Scottish	− 2·1	− 1·3
London Transport—		
Railways	—	+ 0·7
Road services	−13·5	−11·0
Total	− 9·6	− 7·5
Aggregate	− 5·6	− 5·5

LETTERS TO THE EDITOR

(The Editor is not responsible for opinions of Correspondents)

British Railways Locomotive Classes

March 1

SIR,—British Railways have placed a further large order for diesel locomotives, which includes one further new design. There are believed to be no less than 49 classes, totalling 1,431 locomotives on British Railways. All but seven classes have been introduced since nationaliation in 1948, and of 1,431 locomotives 686 are of one class.

About 1950, it was announced that the whole of British Railways traffic could be worked by 12 standard classes of steam locomotives, helped by two classes of diesel shunters.

Yours faithfully,

J. B. LATHAM

Channings, Kettlewell Hill, Woking

Diesel Traction in the U.S.A.

March 3

SIR,—Your correspondent in his article in your February 27 issue states that there are now only 1,200-odd steam locomotives left in service in the U.S.A., but he does not say, why, after 34 years diesel operation and intensive salemanship, there are still such a large number, nor why, when practically every other important country in the world is extending electrification, North America alone is abandoning electric traction.

He quotes the Association of American Railroads on the advantages of the diesel-electric locomotive, but there is no mention of the diesel-hydraulic. These advantages are stated to include the fact that the diesel is a self-contained unit, which accelerates quickly, while its flexibility is enhanced by the system of separate power units; that it consumes a small quantity of fuel for a large output of power; and that although the diesel costs twice as much as a steam engine of equal power, it can make at least twice the monthly mileage.

Applying this to electric traction we find that, like almost all industrial plants of similar power, the electric locomotive is not self-contained, thereby saving the high first and maintenance cost and the weight, up to 400 tons, of its own power house. As machines of up to 6,000 h.p. are easily obtained in a single unit, the multiplicity of small units with their inefficiency and high costs is avoided. With hydro-electric and atomic power, no measurable weight of fuel is involved, while the development of ordinary coal-burning power stations is such that we are in sight of a higher thermal efficiency at the drawbar than the diesel can give. In practice diesel : steam cost ratios are certainly far more than 2, and more likely 10, unless you assume acquisition of new stock in conditions most favourable to the diesel. British Railways will not replace their express passenger steam locomotives by diesels for £16,000. The figure would be nearer £90,000. By the same token it would not require £80,000 worth of coal-burner to operate the new London Midland Region "freight liner" between London and Glasgow.

It is time we realised that the two main reasons for replacing steam for locomotive haulage in Britain are dirt and the inability of the coal industry to produce suitable fuel. Electrification will ensure cleanliness, improved speed, and possibly a reduction in costs. We have no guarantee that the diesel will do the same.

Yours faithfully,

L. IRVINE-BROWN

Tilston, Malpas, Cheshire

Maintenance of Diesel and Electric Locomotives

March 2

SIR,—Your correspondent who writes the articles on British Railways freight operations has pointed out on several occasions the high proportion of new diesel and electric locomotives under repair. He again made a point of this in the article on page 210 of your February 20 issue.

He seems to consider that the newness of the stock ought to lead to a low under-repair figure. Generally speaking, the first few months or even the first half-year of the life of new equipment is extremely troublesome. My impression is that with so many new and comparatively untried designs going into service, 12-13 per cent under repair is by no means excessive. One wonders also whether this figure does not often include vehicles held out of service for technical tests of one sort or another which inevitably occupy much time when modifications are being made to new designs. Also, when a vehicle is new and parts are under guarantee, it may often be held out of service for a minor defect to let the manufacturer concerned make an inspection.

Yours faithfully,

G. H. HAFTER

49, Church Street, Isleworth, Middlesex

THE SCRAP HEAP

Newspapers by Rail (1909)

Mr. Winston Churchill, President of the Board of Trade, promised a deputation representing practically all the newspapers in the country that he would act as their ambassador in securing lower rates and better conditions in carrying newspapers by rail. It was pointed out that although newspapers are carried at owners' risk and handled almost entirely by newspaper employees, the rates are higher than those paid for parcels collected by the companies and carried at companies' risk. —*From "The Evening News," March, 1909.*

B.T.C. Film Nominated for "Oscar"

The British Transport Commission film "Journey into Spring," which was specially commended at the Venice Film Festival in 1957 and awarded the British Film Academy award for the best documentary for 1957, and first prize as the best tourist film at the International Tourist Film Week in Brussels in 1958, has been nominated as one of five films to compete for this year's short film "Oscar" in Hollywood. It is expected that the winning film will be announced on April 6.

"Journey into Spring," a colour film designed to stimulate travel, was made by the B.T.C. Film Unit, under Edgar Anstey, and was produced by Ian Ferguson and directed by Ralph Keene. It depicts the beauty of Southern England as typified by the Hampshire village of Selborne, home of the naturalist Gilbert White.

Starlings on the Tay Bridge

Thousands of starlings are roosting nightly on the Wormit end of the Tay Bridge. Each evening towards dusk hordes of the birds vibrate overhead and perform mass acrobatics before coming to rest on the parapets and girders of the bridge. There they spend the night close-packed in rows. The starlings have driven the dozens of pigeons from their old haunts at the Wormit end of the bridge away over towards the Dundee side.

One can view the close-packed rows of sleeping birds from the front compartment of a diesel train, or walk under the bridge and hear their continual chattering, reminding me of the roosting starlings in Trafalgar Square. —*From "The Scotsman."*

Bus Stop

The 7.30 a.m. Metropolitan Line train from Chesham to Baker Street, London Transport, broke down last Friday between Chesham and Chalfont stations. A number of passengers clambered out and caught a bus on a nearby road. The train, halted by engine trouble, was delayed for 48 min. —*From "The Evening Standard."*

The First Iron Railway?

While wooden rail tramways were used at a colliery in England in 1602, Ireland, a correspondent suggests, was the first country in which the first railway, properly so called, was built. The Sheffield colliery tramway, with the first plate rail, was laid in 1767. The rail was cast-iron, with flat base and upright running edge. It was fixed to transverse sleepers of wood with iron spiked nails. The wagon wheels were not flanged.

In 1787 what was called "Lord Welles's Railway on cast-iron plates" is stated to have been laid at Dunglass Colliery, near Dungannon, in Co. Tyrone. It was planned by Thomas Taylor, of Leicester, said to have been an iron founder by trade. The rail plate was an edge rail to take a flanged wheel. It was 10 ft. long, spiked to baulks cut and squared with the adze out of the nearby forest. About two years later a similar method of platelaying was adopted at Loughborough. Our correspondent wonders if it also was designed by Taylor.

Bi-lingual Brighton

Photo] [J. B. Latham

The large number of French summer visitors to Brighton, easily accessible from France via Dieppe and Newhaven, caused the Corporation to affix this direction sign above the Visitors' Information Bureau

"Skegness is so Bracing"

The painting by John Hassall, from which the G.N.R. produced, in 1908, *the famous poster* (*see page* 291)

Last Rites

(*The House of Lords recently lamented the passing of the steam locomotive*)

O steam loco, where are the charms
That Stephenson saw in thy face?
Not even the Lords, up in arms,
Could do much to strengthen thy case.
The title "Magnificent beast,"
So kindly accorded that day,
Suggests that last-ditchers, at least,
Might try the R.S.P.C.A.

Their lordships' last words were superb
And, maybe, some teardrops were shed,
As adjective, pronoun, and verb
Combined in belauding the dead.
So lovely the sentiments used
To speed an old friend to the grave,
One almost became too bemused
To stiffen the lip and be brave.

One noble debater deposed
(And this seemed to give him much pleasure)
That diesels were only supposed
To act as an interim measure.
But, while their pretensions to fame
Were rankling in hearts somewhat sore,
Was it quite the right time to proclaim
They were ordering so many more?

A. B.

OVERSEAS RAILWAY AFFAIRS

(From our correspondents)

SOUTH AFRICA

Railway Bursaries

Bursaries for technical study at various South African Universities have been awarded to 44 students by the South African Railway Administration for 1959. The bursary scheme was introduced by the South African Railway Administration to fill vacancies in the engineering grades of the service by assisting suitable men to qualify. Thirteen students completed their university courses last year and have been given posts in the railway service. They include six civil, three mechanical and four electrical engineers. Excluding these 13, the Railway Administration has already taken into its service 35 engineers who qualified with assistance of railway bursaries and, excluding those who started this year, 127 men are at present studying at university with the assistance of railway bursaries.

RHODESIA

Rolling Stock Deliveries

Delivery has commenced of 27 first class coaches ordered from the Gloucester Railway Carriage & Wagon Co. Ltd. Three have already arrived in Rhodesia and have been allocated to the £9 return special inclusive fare service on the overnight mail trains on the Salisbury-Bulawayo line.

The total in service cost of the 27 first class coaches now being delivered, 25 second class coaches due to arrive later in the year, and 12 composite coaches which are already in use, will be just over £1,500,000.

Other new rolling stock now coming into service includes 30 guards' vans each incorporating a fourth class compartment, built by Gloucester, 40 bogie refrigerator wagons, built by La Brugeoise et Nivelles S.A., Belgium, and 200 covered wagons, built by Metropolitan Cammell Carriage & Wagon Co. Ltd., of the kind used for tobacco and general goods and which are known in Rhodesia as "K" trucks. Orders for the refrigerator wagons and coaches were placed during 1956, and the "K" trucks and guards' vans were ordered in 1957.

NEW ZEALAND

Kaimai Tunnel Scheme Deferred

A proposal to construct a long tunnel through the Kaimai Hills between Matamata and Tauranga, to reduce the track mileage between Hamilton and Tauranga from 94 to 62 miles, has been deferred. A report by Mr. F. M. H. Hanson, the Commissioner of Works, and Mr. A. T. Gandell, General Manager of the Railways Department, has been accepted by the Government. They reported that the volume of traffic likely to be carried by the deviation was directly related to the rate of development of the Port of Tauranga, and that the pattern of port development was "not sufficiently clear and assured at the present time to allow of its future influence on transport being predicted." They recommended that the Government review of the project when transport requirements to and from the Bay of Plenty became more clearly defined.

Two alternative but similar schemes were considered. The preferred scheme provided for a 15-mile railway, including a 5½-mile tunnel, to be constructed between Waharoa, 33 miles from Hamilton on the line to Rotorua, and Apata, 13 miles west of Tauranga on the Paeroa-Taneatua line. It would have cost at least £5,250,000. Distance from Auckland to Tauranga would have been reduced from 179 miles to 147 miles, and from stations like Rotorua, Mamaku and Kinleith would have been cut by some 62 miles compared with the present long haul northward to Paeroa and southward to Tauranga. It would still be a circuitous route from Rotorua compared with the 56-mile trunk road. Ruling grade on the deviation would be 1 in 70.

IRAQ

Railway Extensions

A Committee has been appointed to consider the requirements of the State Railways. It will study the need for new rolling stock and the building of additional track. Among the projects to be considered is the extension of the Baghdad-Kirkuk-Erbil line to Mosul. The linking of the existing Baghdad-Mosul line to the Basra-Nasiriya-Kut-Baghdad line will also be considered.

The railway administration will be in the market for new rolling stock at some future date. It is reported that the most immediate requirements will consist of 15 steam or diesel locomotives for operation on the Basra-Baghdad metre-gauge line. Included in the programme of the State Railways is the strengthening of the embankments on this line to withstand double the weight of traffic at present carried.

UNITED STATES

North Western "Bi-Level" Train

While double-deck passenger stock is now used fairly extensively in suburban services round New York and Chicago, its main-line use hitherto has been almost exclusively in dome cars of various types, in which the dome seating has been additional to, rather than an alternative to, the normal coach floor seating and sleeping accommodation. The exception has been the "Hi-Level" Santa Fe "El Capitan" train between Chicago and Los Angeles, with the entire passenger accommodation on the upper level.

The Chicago & North Western Railway has now introduced two "Bi-Level" trains for high speed day service between Chicago, Green Bay and Upper Michigan, in which the passenger cars

Main-Line Operation in New Zealand

Photo] [W. W. Stewart

"Night Limited" express train from Wellington passing Papakura, 21 miles from Auckland, hauled by a 140-ton oil-fired "K" class locomotive

are all of the gallery type, seating four abreast on the lower level, with central gangway, and with a row of single seats on both sides of each car at the gallery level. With other weight-reducing features, a 96-seat gallery coach weighs 1,302 lb. per seat, as compared with 1,827 lb. per seat in a conventional reclining chair coach of the latest type.

To match the height of the new gallery coaches, two dining cars and two lounge cars have been rebuilt to the same profile. Six diesel-electric units in pairs have been allocated to work the "Bi-Level" trains, and their steam-heating boilers have been replaced by 575-h.p. auxiliary diesel engines, coupled to 480-V. alternators, to supply current for lighting, heating, air-conditioning, and cooking throughout each train.

CANADA

Piggyback Service

Canadian National and Canadian Pacific Railways piggyback services for licensed "for hire" road vehicle operators has been extended from Winnipeg to Regina, Saskatoon, Calgary, Edmonton, and Vancouver. The addition of the five cities by the two railways in Saskatchewan, Alberta, and British Columbia has extended the service from coast to coast. Piggyback, combining the low cost of rail transport with the convenience and flexibility of the road vehicle in urban centres, was introduced for licensed "for hire" truckers between Montreal and Toronto in October, 1957.

SPAIN

Railcars for Catalonian Railways

The privately-owned Catalonian Railways, a metre-gauge system of 76 route-miles of which eight are electrified, put into operation some new railcars of German manufacture on the Barcelona-Igualada service, reducing this journey time to 90 min. instead of 2 hr. The cars have two 150-h.p. engines placed below the floor and accommodate 52 passengers. They haul a trailer of like capacity.

ITALY

Venice-Munich Line

A new rail and pipeline link connecting Italy to Central Europe is being studied. The plan is to provide a direct line between Venice and Munich. The project is known as the Aurine Alps (Zillertal Alps) Railway and Pipeline. The plan, which is based on an Austrian project of 1900, envisages the piercing of a tunnel 27 miles long and the route would cross the Alps about 20 miles East of the Brenner Pass. The Italian frontier station would be at Brunico. The new line would reduce the distance between the port of Venice and Munich by 150 miles from 355 miles to 205 miles.

Because the line would be built to take high-speed traffic the rail time from Venice to Munich via the Brenner Pass would be reduced from the present 14 hr. to about 3 hr. The total cost of construction is calculated at about £150,000,000, of which £100,000,000 would be spent on the 125 miles in Italian territory.

SWITZERLAND

Doubling between Zurich and Sargans

Doubling of the main line between Zurich and Sargans has necessitated amongst other major works a double-track tunnel, 12,900 ft. long, on a diversion between Weesen, 38 miles east of Zurich, and Mühlehorn. This diversion replaces the single-track section alongside the Walensee, which traverses four smaller tunnels on the lakeside. Weesen Station is to be rebuilt. Preliminary work began in 1957. Doubling and associated works are expected to be completed by April, 1960.

WESTERN GERMANY

New Ferry Route to Denmark

A new route is to replace the provisional ferry route, 43 miles long, between Grossenbrode, in Schleswig, and Gedser, in Denmark, which has been operating since 1951. The scheme involves extending the line from Lübeck northwards from Grossenbrode over the Fehmarn Sound by a new combined rail-and-road bridge and across the island of Fehmarn to a new ferry harbour at Puttgarden, only 11½ miles from Rödbyhaven, in Denmark, whence there is railway communication via Nyköbing with Copenhagen. The increasing passenger and motorcar traffic have made it essential either to equip Grossenbrode with better and more permanent facilities and obtain an additional ferry vessel or to undertake the works now agreed between the two Governments. The three existing ships will suffice to carry, on the much shorter passage, more than double the traffic now passing via Gedser. Journey time will be reduced by 1½ hr. and passenger traffic now passing via Flensburg, Fredericia, the Little Belt bridge, Nyborg, the Great Belt train ferry, and Korsör will be diverted to the new route.

U.S.S.R.

Electrification Plans

The Moscow-Leningrad line is to be electrified and should be completed by 1965 to permit through electrified running from the Baltic to the Pacific. Train speeds will be increased by 40 per cent and operating cost considerably reduced.

Publications Received

Decay of Timber and its Prevention (Second edition), by K. St. G. Cartwright and W. P. K. Findlay of the Forest Products Research Laboratory, Department of Scientific & Industrial Research. H.M. Stationery Office. 332 pp. 10 in. × 6 in. Illustrated. Price 27s. 6d.—First published in 1946, this work has now been completely revised to include recent research work. The causes of decay and treatment of sleepers, poles, fencing posts and other timber products are reviewed mainly from the point of view of railways in this country. Imported Scots pine partly-seasoned sleepers seldom decay in storage before treatment. It is *lentinus lepideus* that usually rots sleepers, because of its tolerance of a comparatively high concentration of creosote fatal to other fungi. Insufficient or irregular absorption of creosote—a result of excessive moisture in the wood preventing the movement of the creosote oil—causes failure, but the Boulton impregnation process gets rid of the water. Because of their resistance to impregnation, Douglas fir and some other timbers have to be incised to insure that cracking after treatment does not expose wood that would be untreated without incision.

Dutch Engineering Products.—A second edition of "Metal Products from Holland" issued by the Association of Metalworking Industries in the Hague lists the engineering products of Holland and gives details of the manufacturers. The 795-page book is in four languages, English, French, Dutch, and Spanish. In the four-language classified register of products, locomotives are sub-divided into steam, electric, diesel-electric, and diesel-hydraulic, with separate entries for mines, locomotives and rail tractors. Suppliers of rolling stock and other railway material are fully indexed. Other products listed include diesel engines, fuel oil installations, bridges, and cranes, also smaller items such as springs and cleaning machines. Applications for free copies, stating what branch of trade or industry is represented, may be addressed to the Association of Metalworking Industries, 13, Nassaulaan, The Hague.

Electricity in Industry.—Issue No. 16 of this publication, the technical review of the Lancashire Dynamo Group, contains an illustrated article on variable speed drives reviewing the development of equipment incorporating electronic and magnetic amplifier controls. Another article describes winding methods and coil construction of power transformers. Copies of the issue are available on application to Lancashire Dynamo Group Publicity Services, St. Stephen's House, Victoria Embankment, London, S.W.1.

C.T.C. Extensions in Spain

Good results obtained on the Ponferrada incline have led to extensions and other installations under a five-year programme

THE first C.T.C. installation in Spain was brought into service, as described in our issue for April 1, 1955, on April 27, 1954, between Ponferrada and Brañuelas, 30 miles. Over this section the gradient is mostly 1 in 50, with 29 tunnels. The line is one of the busiest in Spain and is part of the main route of the Spanish National Railways (R.E.N.F.E.) connecting León with Monforte.

Colour-light signals, manually operated, had been introduced in 1947 under steam traction. The great difficulties encountered with steam operation in the tunnels led to conversion to electric working in 1949 between Brañuelas and Torre and this became extended to Ponferrada in 1953. Many civil engineering improvements also were carried out.

Increased Line Capacity

After the C.T.C. equipment was brought into use about 30 trains a day could carry traffic for which at least 36 usually had been needed. Running and standing times became much reduced and average speeds over this steeply graded section appreciably increased.

The tonnage of coal moved from Ponferrada, long the most important station in Spain for such freight, has been tripled and is expected to increase considerably in the next few years, as is other traffic also. The six intermediate stations which have two and sometimes three passing sidings, are at an average of 4·35 miles apart. The signals are of the searchlight pattern. The controller's machine is at Ponferrada and deals with 38 pairs of points and 56 signals.

Extensions

The results obtained with this initial installation, surpassing expectations both from the economic and operating points of view, led the R.E.N.F.E. management to consider extending the system in both directions, as a first stage to León on the east and Orense on the west and subsequently onwards from León northwards to the coast and from Orense westwards to Vigo as shown on the accompanying map. The latter is taken from an article by Señor Mateo Silvela Tordesillas, the engineer in direct charge of this new signalling work, in a recent issue of *Ferro Carriles y Tranvías*. In addition other installations have been planned covering a number of sections where traffic conditions are such that they can bring advantages comparable with those obtained on the Ponferrada incline.

Andalusia

A comprehensive programme to improve the main route connecting Madrid with Cadiz through Córdoba and Seville was drawn up some time ago and the greater part of the extensive works necessary has been completed. They form part of a plan to improve communication generally throughout Andalusia, where some new bases have been constructed, and have involved strengthening of bridges, renewal of nearly 220 miles of track effecting improvements on another 235 miles, with much lengthening of lines in stations and crossing places.

The section between Alcázar and Córdoba will shortly be operated electrically. Diesel services, with new sheds at Seville, are being introduced between Córdoba and Cadiz. The C.T.C. working is to extend from Baeza to Córdoba and Lora and between Seville and Cadiz as shown on the map. The greater part of the equipment was brought into service in 1958 and the whole will be completed during the present year. All these far reaching changes have been effected principally with American aid.

Galicia and Asturias

The work in these provinces, already outlined above, is designed to accelerate the transport of ore from sources lying between Ponferrada and Galicia. Two mines near the former began working some 18 months ago and in a period of 12 months about a million *tonnes* of mineral were conveyed to the ports of Vigo and Corunna; the tonnage is expected to more than triple itself in two to three years. A heavy programme of engineering works is in hand to improve these routes and orders for 750 ore wagons have been placed: 150 are already in service. The C.T.C. is expected to be complete between León and Orense during the present year.

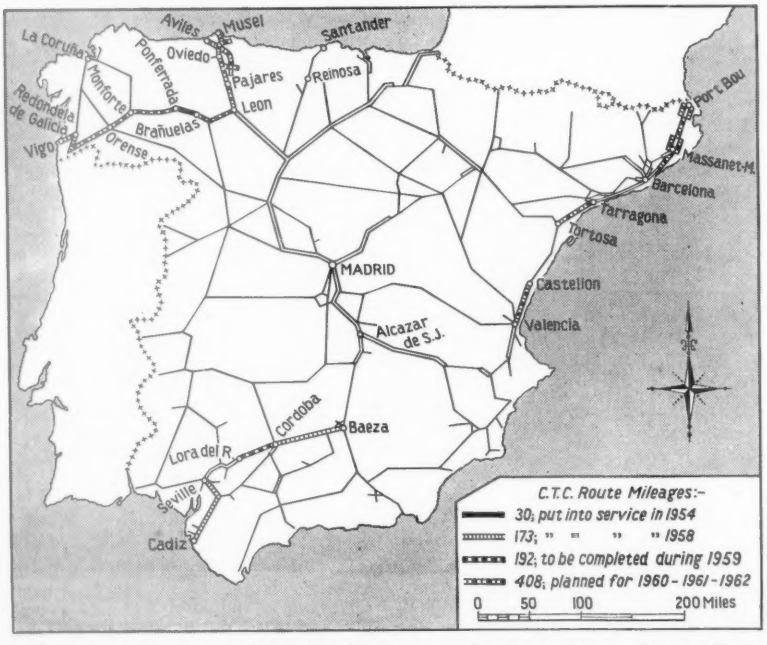
In Asturias the improvements have involved electrification of all routes connecting León with the principal centres of the province, renewal of the track throughout and the erection of a number of artificial tunnels as a protection against heavy snowfalls. Traffic is constantly increasing as Asturian industry expands, notably the coal tonnage, which has risen from about 2½ to about 4½ million *tonnes* annually from 1944 to 1958.

The new national and very important steel works at Avilés have commenced production and this in turn demands improved rail facilities. The application of C.T.C. in this area has been delayed by lack of the necessary exchange, but the difficulty is expected to be overcome shortly, again under the American aid programme.

Fruit Traffic

The line along the Mediterranean coast connecting Valencia with Port Bou, on the French frontier, through Barcelona carries a heavy traffic in greenstuffs and fruits of various kinds; orange consignments are especially heavy between November and May. This line last season carried about 350,000 *tonnes* of this fruit, or some 40 per cent of the total export trade. The intention

(*Continued on page* 308)



Principal lines of Spanish National Railways, showing sections where C.T.C. is in operation, being installed, or projected

Diesel Maintenance Depot at Tyseley, Western Region

Simultaneous servicing of six three-car train sets

MAINTENANCE of diesel railcars and diesel shunters supervised by the Wolverhampton District Running & Maintenance Officer of British Railways Western Region is now carried out in the new depot at Tyseley, near Birmingham.

The stock at present handled consists of three inter-city sets operating the Birmingham/Swansea Service, 31 multiple-unit suburban sets, 10 multiple-unit cross-country sets, three single-unit cars, and eight diesel-electric shunters. The average daily mileage of the suburban cars is 300 and that of the inter-city 350. Cross-country sets average about 200 miles a day.

In the maintenance shed six roads, each 210 ft. long, accommodate six three-car sets. The car mileage record system in operation at the re-fuelling points enables the depot supervision to plan maintenance for maximum shed utilisation.

Covered accommodation, with pit facilities, is provided at the re-fuelling points at Wolverhampton, Stourbridge, Leamington, and Tyseley. A daily mechanical and electrical inspection is carried out on all cars at each of these points. At Tyseley the inspection pits are on two through roads. One takes a three-car set and the other a four-car.

Daily Inspection

The daily check is made by one fitter and one electrician, taking approximately one hour for a three-car set.

The correct functioning of all engine, control, transmission, and auxiliary equipment is checked. This is followed by an examination for loose or defective parts and leaking pipes and unions. A small workshop is provided for the use of the fitters.

The daily examination is extended every third day to include oil level checks of gearboxes, and final drives, and recharging of grease nipples.

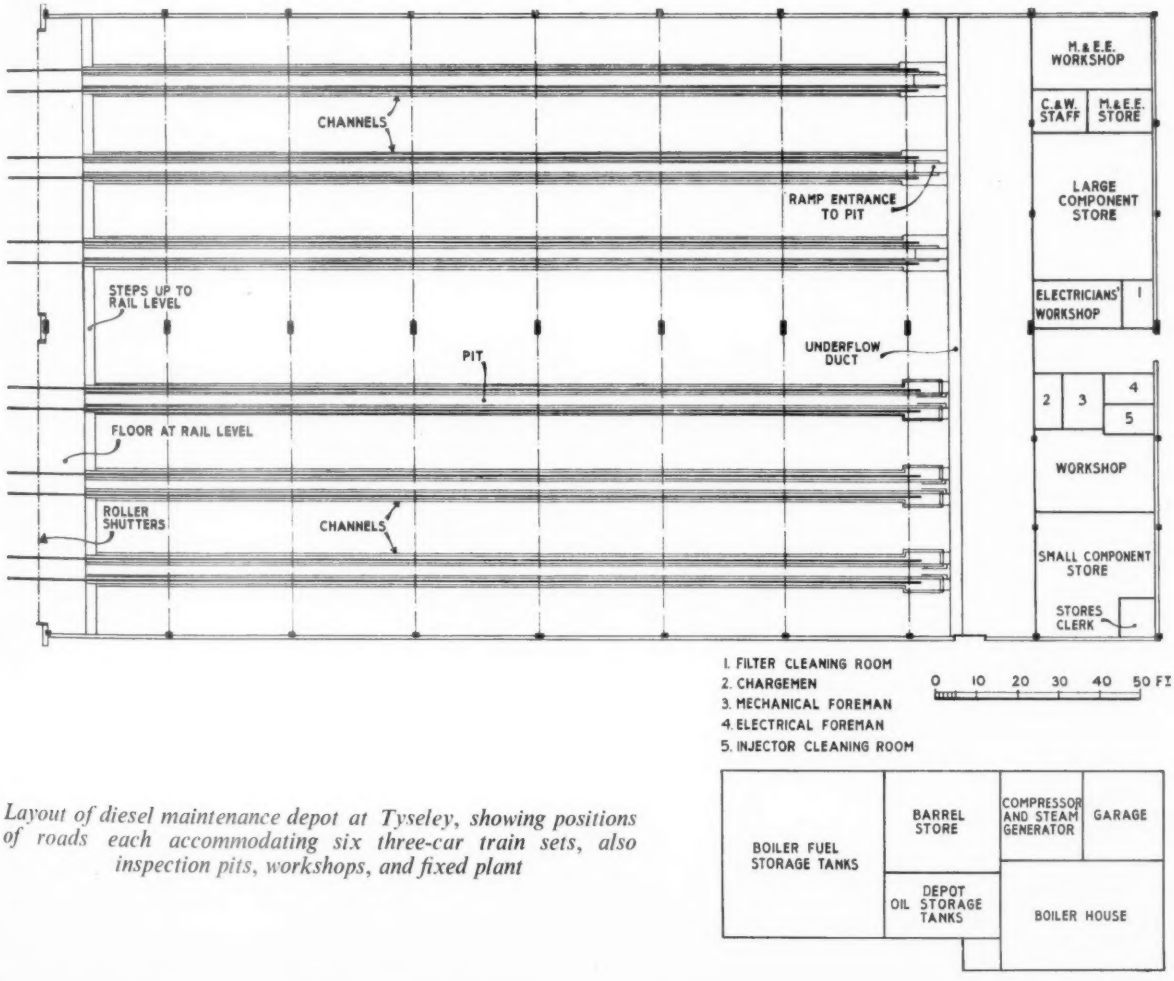
Fuel is stored in three 12,000-gal. storage tanks, piped to eight suitably spaced delivery points, each fitted with a flow meter.

Oil and Coolant Supplies

Supply of lubricating oil and coolant is from six locally modified Donald trucks, each fitted with a 40-gal. drum, hand-operated rotary pump, and flow meter. Two trucks carry engine lubricating oil, one gearbox oil, one final drive oil, and two carry anti-freeze solution.

It is now the practice in the Western Region to use anti-freeze solution as coolant throughout the year. Besides the topping-up, the coolant is changed at specified intervals and returned to store for cleaning and reconditioning. The oil drums are housed at the re-fuelling site in an electrically heated store.

Each railcar carries a log book containing records of daily examinations, fuel and oil used, and car mileage.



Layout of diesel maintenance depot at Tyseley, showing positions of roads each accommodating six three-car train sets, also inspection pits, workshops, and fixed plant

BRITISH RAILWAYS (W.R.)

DAILY EXAMINATION DETAILS OF DIESEL RAILCARS/LOCOMOTIVES

at .....(Depot)

S'don 2799

Power Car/Loco. No. _____

Home Depot _____

Date _____ Set No. _____

Category of Examination _____ Initials of Examg.Fitter _____

Mileometer Reading (a) _____

Fuel (b) _____

LUBRICANTS (pints)	No.1 Engine	No.2 Engine
Engine	c	d
Gearbox	e	f
Final Drive	g	h
Fluid Coupling	i	j
Torque Converter	k	l
Crater Compound	m	n
Miscellaneous		o
Grease (lb.)		p
Anti-freeze	q	r

Initials of

Fitter .....

Electrician .....

C.& W.Examiner.....

Chargeman Fitter .....

Mechanical Foreman .....

Mileage since last Examn.

.....

Re-fuelling station daily record sheet

From the duplicate copy of the daily record sheet, which is passed to the maintenance depot, the mileage clerk prepares a schedule of cars due for depot examination.

Inspection at 3,000 Miles

The first depot inspection of each car is carried out when the car mileage is 3,000, followed by further examinations at each subsequent 3,000 miles. New cars are given a general check at 500 miles. The mechanical examination at 3,000 miles is concerned primarily with power units and transmission, though tests of the vacuum brakes and A.T.C. equipment are included. All pipework and joints are examined and any water which has accumulated in the compressed air units of the change speed and final drive gear is drained off. During the winter months alcohol is introduced into the air system to prevent freezing. Main and auxiliary drive shafts are examined, and driving belts adjusted or replaced as required.

On the power units the rocker covers are removed and the valve springs examined for breakages. Fuel pump controls and all engine external pipework is examined. Air and fuel filters are cleaned and elements renewed as required.

In the electrical check, all control fuses, starter motor relays, starter motor pinions, switches, and jumper socket connections are examined. After an overall check for loose connections and security of cables, tests are made for earth faults. Batteries are inspected and serviced as required.

The electricians are also responsible for the inspection and maintenance of the fire extinguisher equipment and of the Smiths combustion heaters. This includes a check on the CO_2 content of the heater exhaust gas.

The time taken by two fitters and mates to carry out the check at 3,000 miles is some 4 hr.

Inspection at 6,000 Miles

At the 6,000-mile examination, engine oil filter elements are cleaned or renewed, radiator elements cleaned with compressed air, and the anti-freeze coolant renewed. In the power units tappet clearances are re-set, fuel injectors removed, and tested, cylinder head nuts checked, and the engine suspension examined. The timing of the fuel pumps is checked and a test made to ensure that engine speeds are synchronised.

Covers are removed from the change speed and final drive gearboxes and wear adjustments made as required. Fire extinguisher bottles are weighed to check capacity and, on the running gear check, axle-boxes are greased on all cars.

Before the 6,000-mile examination the whole of the running gear is sprayed with Basol detergent and hosed down.

Inspection at 12,000 Miles

Engine oil is changed at the 12,000-mile examination and the used oil returned to Swindon for reclaiming. Cylinder head assemblies, complete with valve gear, are removed at 36,000 miles and returned to the Western Region Swindon Works for reconditioning. Complete engines are changed, according to condition, when the mileage is between 80,000 and 108,000.

The record system facilitates forward requisitioning of spares with a minimum of stockholding. Two spare engines of each type suffice for Tyseley depot requirements. Twelve B.U.T. type "A" and 24 B.U.T. type "L" cylinder head assemblies are carried to provide quick servicing.

Other major spare components are change-speed gearboxes, final drive gearbox components, control equipment, exhausters, fuel pumps and starter motors. All defective or worn components are returned, with a history card attached, to the Swindon depot for replacement.

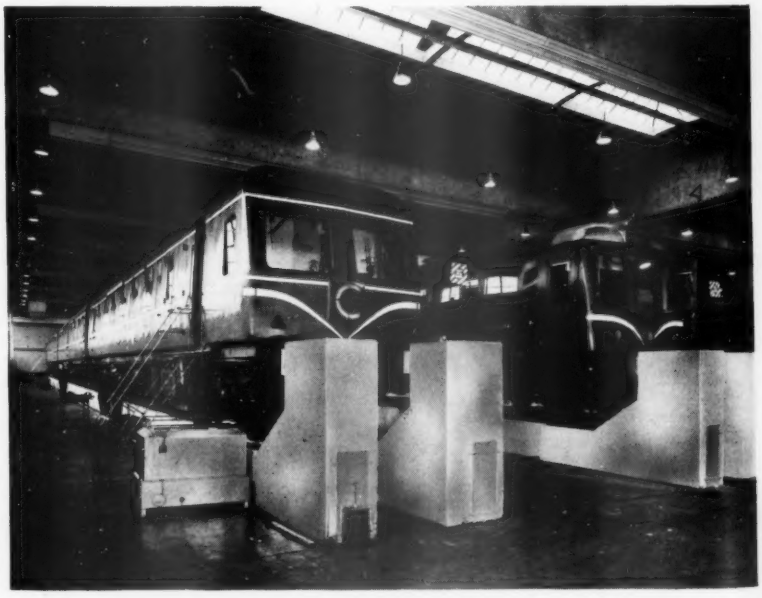
Maintenance of Shunting Locomotives

Eight English Electric 350-h.p. diesel-electric shunters are based on Tyseley. They are serviced in a building adjoining the railcar depot.

The servicing schedule is arranged to cover specified examinations at intervals of two and four weeks and six and 12 months. On the fortnightly mechanical check an overall examination is made for loose parts, fuel tanks filled and oil levels topped up in the engine sump, air compressor and exhauster. Oil and air filters are cleaned, radiator examined, and a check made of the air brake functioning and of the vacuum equipment. During the servicing period there is an external inspection of the electrical equipment for security of connections, and the battery is serviced.

In the monthly check the engine crankcase doors and valve gear covers are removed. Valve springs are examined for breakages, tappet clearances re-set, and fuel injectors removed and tested. Big-end and main bearing bolts are checked for security and the oil flow from crankshaft bearings, camshaft bearings, and valve gear observed.

All pipework is examined, filters cleaned, and auxiliary drive belts adjusted. Wheels, tyres, and drawgear are examined, and the dead-man



View from workshop end showing radiant heaters on roof-beams and inspection pit entrance

Re-fuelling station and pits for daily inspection

controls tested. Running tests are made on the air compressor and exhauster equipment.

Examination of Electrical Equipment

In the electrical equipment check all brushgear is cleaned and new brushes fitted as required. Traction motor mountings are inspected and generator compartment filters are cleaned. The controllers are cleaned, lubricated and adjusted, and the control cubicle equipment checked for correct operation.

Also checked for correct operation are the dead man's pedal, reverse current relay, lub: oil pressure switch, light switches, and safety devices. This examination takes approximately eight hours. The six-monthly mechanical examination includes a check of the crankshaft alignment and at this stage the exhaust valves are removed and reconditioned. The inlet valves receive attention at the 12-monthly examination. A sample of the engine sump oil is taken for a viscosity and contamination check. The electrical examination schedule for the six-monthly period includes a check of all brush spring pressures, greasing of bearings, and inspection of insulation. All contact pressures are checked and the reverser contactors cleaned and lubricated. The voltage regulator is cleaned and an equalising charge put on the battery. The time needed for this examination is about 12-16 hr.

Layout

The building is 240 ft. long × 150 ft. wide × 25 ft. high. Natural roof lighting is by Hills decklights. In addition the structure is glazed on one side.

At the entrance to each of the six roads is an electrically operated roller shutter. At the opposite end are the workshops, offices, and stores. The general floor level is 2 ft. 9 in. below the rail level, which gives a good working height for inspection and maintenance. The pit floor between the rails is 4 ft. below rail level.

Each pit is lit with continuous tungsten lighting. It contains six supply points, suitably spaced, for compressed air, water, and electricity. No built-in overhead lifting gear has been installed.

Adjoining the fitter's workshop are separate rooms for cleaning injectors and filters. The spare components store is well equipped with Waddles steel racking. Separate bays are provided for mechanical and electrical parts.

At the boiler house site there are three 3,000-gal. tanks for bulk storage of clean engine oil, used engine oil, and for coolant. These are piped to a dispensing panel in the depot.

Handling Heavy Equipment

The depot is fully equipped for the simultaneous servicing of six three-car sets. Engine changing is expedited by the use of a 4,000-lb. capacity Diamatic fork-lift truck, which is also used for the internal transport of heavy equipment. Two 10-cwt. capacity hand winches are used for gearbox handling. For access to cabs there are 12 Auger portable lightweight safety staircases, and for the fitters' use alongside the cars four portable benches, each fitted with a vice.

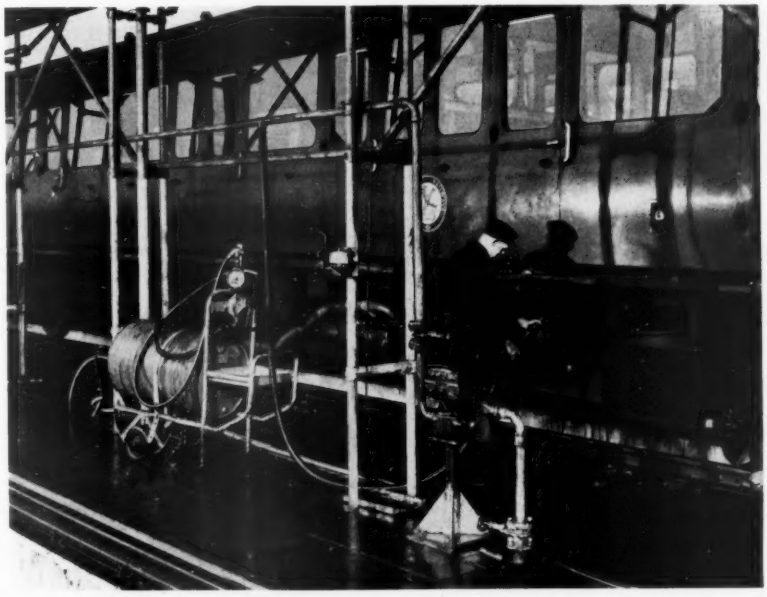
Two items of equipment made up at Tyseley are a test rig for the workshop testing of combustion heaters, and a portable unit which, when plugged into any jumper socket, enables the control circuits to be tested.

From the dispensing panel oil is supplied to the cars by a Wakefield Dick mobile oil dispenser. The air-motor driven pump on this is pressurised for feeding by connecting to one of the compressed air connections at the pit. Two similar units are used for pressure greasing. There is also a mobile sump drain-and-refill unit. Battery charging is by four portable Westalite 70-A. chargers.

For cleaning underframes there are four mobile cleaning tanks, fitted with foot operated pumps. The fitters' shop is equipped with power drill, bench grinder, depot tool kits, and lockers.

Heating and Ventilation

General heating is by high-pressure hot water circulating through blower type projector heaters and through overhead radiant panels. These panels,



Fuel dispensing through flowmeter at re-fuelling site. Oil is hand-pumped from trolley

which are 50 ft. lengths of Copperad Raystrip units, are mounted transversely above the pits at roof-beam level. The heating element is a corrugated aluminium sheet 12 in. wide, thermally bonded to a 1¼ in. bore steel pipe.

Above the aluminium is an insulated channel section backing plate which prevents loss of heat upwards. The heaters are suspended at 45 deg. to the horizontal to secure maximum coverage.

At each end of the building are four thermostatically controlled Dunham blower heaters, each rated at 220,000 B.T.U. per hr. These can be set to operate as re-circulating heaters or to draw fresh air.

Maintaining Constant Temperatures

The complete system is designed to maintain temperatures of 60° F. in the depot and 70° F. in the annexe, with three changes of air in an hour and an external temperature of 30° F. Roof extractor fans for the removal of exhaust fumes are positioned over the area of the pits.

Heater pipes, operating at a reduced pressure and temperature, are fitted at floor level in the inspection pits. Convector heaters are fitted in the offices, stores, and workshops. The heating boiler is of the fully-automatic oil-fired Steambloc package type. The boiler, rated at 5,000,000 B.T.U. per hr. is coupled to a Spanner nitrogen pressurising unit operating at 150 p.s.i. The hot water from the boiler, at a temperature of 330° F., is circulated through the ring mains by two electrically driven Mopumps. Boiler fuel oil is stored in two 12,000-gal. tanks, fitted with 6-kW. outflow heaters.

A low-pressure steam generator is installed to supply the steam heating coils in the tank wagons bringing fuel supplies for the storage tanks. Flexible hoses are used for the steam connection to the wagon, and from the wagon to the motorised oil transfer pump mounted alongside the storage tanks.

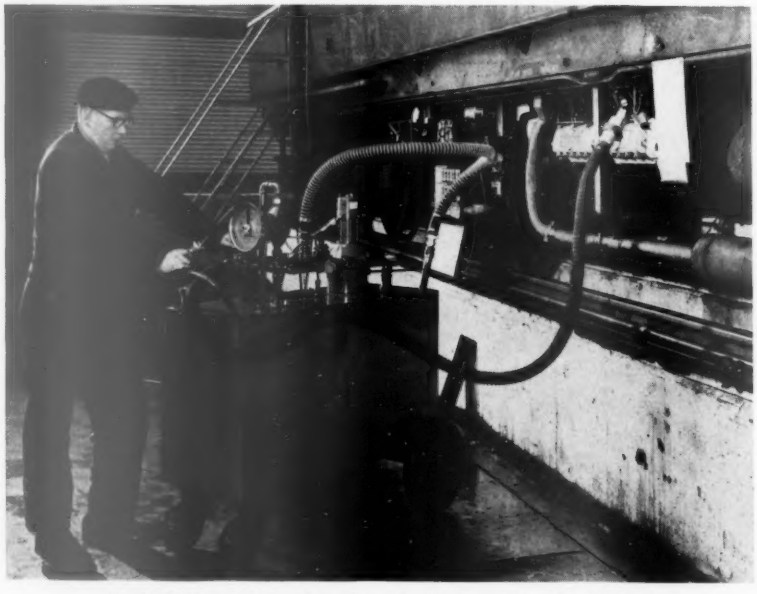
Installation of engine with fork-lift-truck, showing forks under engine

The normal complement of the diesel depot, including supervision, is approximately 100. This includes 36 diesel fitters, 34 assistants, and 14 electricians. All staff concerned with diesel maintenance receive three weeks intensive instruction at Swindon and approximately four weeks at the works of power and transmission equipment suppliers.

Extensions envisaged include a new amenities block, and improved accommodation for the maintenance fitters, train crews, and supervisory staff at the re-fuelling site.

The principal sub-contractors are as follow:—

Building	Lovatt Wilson & Sons Ltd.
Roller shutters	Dennison Kett & Co. Ltd.
Heating installation	G. N. Haden & Sons Ltd.
Heater boiler	Spencer-Bonecourt-Clarkson Limited
Raystrip heater panels	Copperad Limited
Lighting	Dale Electric (Yorkshire) Limited Lee Beesley & Co. Ltd.
Oil storage tanks	J. B. Pillin Limited
Mobile oil dispensers	Wakefield-Dick Industrial Oils Limited A.P. Manufacturing Company Liquid Systems Limited
Fuel pump test equipment	Leslie Hartridge Limited
Filter cleaning	Ozonair Limited
Fork-lift truck	Diamatic Limited
Safety staircase	Vulcascot (Great Britain) Limited
Battery chargers	Westinghouse Brake & Signal Co. Ltd.
Stores racking	Waddells (Stratford Steel Equipment) Limited
Basol detergent	Basol Limited
Cleaning tanks	Mann-Egerton & Co. Ltd.
Depot tool kits	Jenks Bros. Ltd. Abingdon King Dick Limited



Wakefield Dick combined used-oil removal and refill unit

EDINBURGH-INVERNESS SLEEPING CAR SERVICE.—British Railways, Scottish Region, proposes to introduce an experimental sleeping car service between Edinburgh and Inverness from June 15. First and second class sleeping berths will be available five nights each week in each direction, Mondays to Fridays inclusive. Departure from Edinburgh Waverley will be at 10.55 p.m., giving an arrival at Inverness at 5.30 a.m., but passengers may remain in their berths until 8 a.m. From Inverness departure will be at 11.20 p.m., with arrival in Waverley at 8.19 a.m. Calls will be made in each direction at Inverkeithing, Dunfermline Lower, Cowdenbeath, Kinross, and Milnathort. The supplementary charges for first class berths will be 30s. and for second class berths 12s.

ELECTRIC RAILWAY TRACTION SECTION

Controller Practice

IT is helpful if a change in traction system can be introduced without requiring radical alteration in familiar methods of handling locomotives and motor coaches. When the change is from d.c. to a.c., the readjustment of practice in handling a locomotive controller should be easy, for the a.c. conditions are less restrictive, often allowing all notches to be used for continuous running and removing the need to observe short time ratings in certain positions. This does not mean that every step in the tap-changing sequence need have a corresponding notch on the controller.

One design for British Railways a.c. locomotives enables 20 out of 24 steps to be selected by the driver, thus coming between the 12 running notches in one of the 2,760-h.p. Co-Co locomotives on the Manchester-Sheffield line and the 33 notches in the new Southern Region motor-generator locomotives, described in our February 13 issue, for the Kent coast electrification. In arriving at a suitable number of notches, the questions to be considered are the provision of an adequate number of evenly-spaced characteristics and the accommodation of the corresponding controller positions within a quadrant and mechanism of convenient size. In the Southern Region locomotives the large number of notches has led to the choice of a to-and-fro action of the handle for manual control, and a similar procedure is used for notching up recent French locomotives.

It would not be surprising to see the traditional lever or handwheel becoming of secondary importance to a notching current control acting on an accelerating relay with a variable setting. This device is seen in recent Belgian National Railways locomotives, and is also used in an a.c. locomotive class for the Belgian Congo in which a d.c. type of camshaft controller has been modified for tap-changing

The relatively small number of electric locomotives operating hitherto on British Railways leaves scope for experiment without disturbing widely-held driving habits, but for motor coach stock it is probably wise policy to restrict the controller handle positions to four or five, corresponding to the shunting, series, parallel and weak-field settings of the normal d.c. motor coach controller with automatic acceleration. If five notches are chosen, a setting intermediate between those corresponding to series and parallel might be more useful than two weak-field steps at the high-speed end of the range.

Progress Reports

(By a correspondent)

IT cannot be long before technical details of the first British Railways 50-cycle rolling stock, built to the orders placed in 1957, are generally known. Motor coaches have been running for some time for crew training and test purposes on the Styal line of the London Midland Region, and Colchester-Clacton-Walton section of the Eastern Region. There is a contrast between practice in this country and on the Continent regarding the release of information. Detailed descriptions of new locomotives for a.c. and d.c. lines of the French National Railways have been issued, with drawings, soon after orders for prototypes have been placed. Sometimes the descriptions are compiled jointly by the railway authorities and the contractors. Both seem to work together harmoniously in these matters, and the official S.N.C.F. film on the Valenciennes-Thionville electrification acknowledged the part played by industry by showing close-ups of builders' nameplates on the locomotives.

One argument often heard against the early publication of technical details is that designs necessarily undergo numerous modifications from the time the specification is accepted until the first locomotive of a new class appears. A new locomotive, after delivery, sometimes has to be returned to the builder for changes to be made. When such things happen, however, the fact that the final product will differ in certain particulars from a description of the project published 12 months earlier is likely to be the least of the worries of those concerned. In any case, the function of the technical Press is not to be a catalogue against which goods can be ordered, but a record of development, mistakes included.

These reflections have been prompted by a recent visit to the works of a manufacturer engaged on electrical contracts for British Railways. Various items of equipment were seen in an advanced stage of manufacture, some of them being developments exclusive to this country, yet the request was made that no report of this work should be published. This was not for the purpose of preserving technical secrets, but in order to observe the condition that work undertaken for British Railways should not be publicised by the contractor before the official account has been released. No doubt this arrangement was conceived originally for the protection of the contractors themselves, so that the reticent and cautious should not find themselves suddenly overshadowed by those with larger publicity budgets and fewer inhibitions. There are times, however, when it might be wise to consider relaxing the rule to allow the controlled release of intermediate information.

Such a practice would have been highly appropriate in relation to the 25-kV. 50-cycle electrification programme, of which there is so much that is new to be said that if it is all said at once, when a particular scheme is completed, some details of high technical interest may become submerged in the general mass. It is true that facilities have been given to the Press for viewing progress on the Manchester-Crewe electrification, and works associated with the Tilbury and Southend scheme, but the emphasis has been rather on the railway than on the industrial aspect, and it is news of how British industry is meeting the challenge of the new electrification system which would be particularly useful to this country if widely known abroad. It is unwise to ignore the fact that the adoption here of a system so intensively developed and sedulously publicised beyond the Channel is sometimes viewed as an abdication of traditional British inventiveness. It is a pity, then, that more has not been said of the advances being made in semi-conductor rectifiers for traction, to take only one example, emphasising the improvement in peak inverse voltage rating which is at the root of the development of units sufficiently compact for underframe mounting in a single unit comprising rectifier trays, transformer oil cooler and smoothing equipment all in line with a single axial-flow blower.

It may be that the restriction on individual publicity has been interpreted too narrowly, either by contractors themselves or by some levels in the railways' own public relations organisations. The time is opportune for fresh thinking on the subject of whether firms which have been responsible for distinctive contributions to modernisation in 50-cycle traction or associated signalling problems should be free to make them known ahead of complete schemes being finalised if they so wish. Continuity of information is being maintained by the railways already in connection with their own work in the modernisation programme. Would it not be appropriate for industry, which plays so important a part in implementing that programme, to have facilities for doing the same?

S.N.C.F. Dual-Frequency Locomotives

Two designs for inter-running between lines electrified on French and Swiss a.c. systems

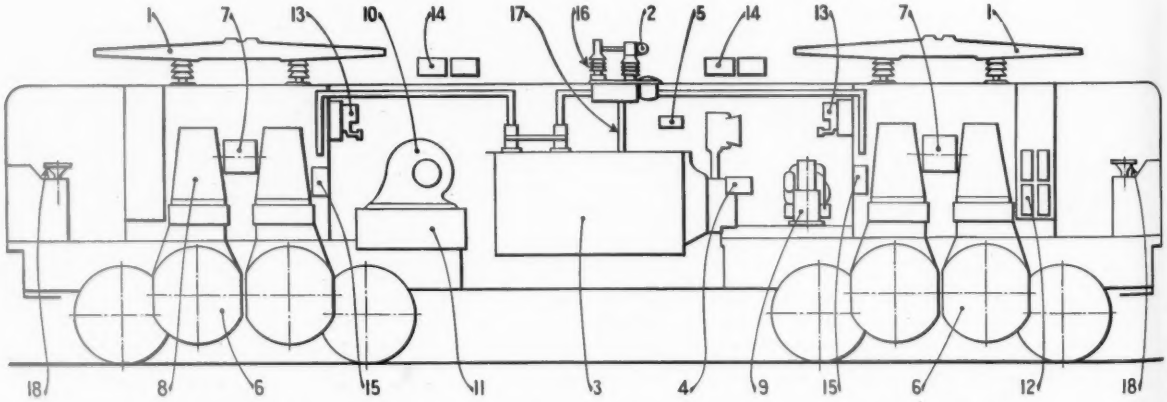
END-ON junctions between French National Railways lines electrified at 25 kV., 50 cycles, and lines of the Swiss Federal Railways electrified at 15 kV., 16 2/3 cycles, occur already at Basle and Pontarlier. At both stations provision is made for energising the overhead line on certain tracks with either supply, but it was decided in the interests of operating flexibility that certain locomotives should be equipped for operating on the two systems so that their movements in these junction areas, or beyond if necessary, should be unrestricted. In 1955, therefore, the S.N.C.F. ordered four prototype dual-frequency four-axle locomotives from Swiss builders, two with a.c. motors and two with d.c. motors supplied through rectifiers.

Apart from the rectifier and motor circuits, the electrical equipment of the two prototypes is similar. The electric Traction Development Division of the S.N.C.F. decided that some reduction in performance when operating on the Swiss system would be acceptable, the alternatives being a larger transformer and arrangements for changing from one primary tapping to another according to the voltage being collected. A fixed connection to the primary has been adopted, therefore, and compensation for the reduction in input volts from 25 kV. to 15 kV. follows automatically because of the accompanying decrease in frequency from 50 cycles to 16 2/3 cycles and the proportionally reduced impedance of the winding. Where auxiliary machines are driven by a.c. series motors the same effect avoids the need for changeover switching, but this provision is required for machines driven by d.c. motors supplied through rectifiers.

Single-Motor Bogies

The measures described above to provide a dual-frequency locomotive are applicable only to the special case of running over two systems which differ

Side elevation of locomotive No. 30001, showing leading dimensions



1 pantograph
2 circuit breaker
3 transformer
4 H.T. tap charger
5 resistance
6 traction motor
7 motor blower
8 motor blowers
9 motor compressor set
10 blower for oil cooler
11 cooler
12 batteries
13 contactor shunt
14 resistive shunt
15 inductive shunt
16 roof busbar
17 H.T. bushing
18 controller

Layout of electrical equipment in locomotive No. 30001

both in voltage and in frequency. A development of more general interest in the rectifier locomotives is the use of single-motor bogies, in each of which is mounted one traction motor of 2,440 h.p. (continuous rating) geared to both axles. Advantage has been taken of the high adhesion made possible by this form of axle coupling to provide the locomotive with alternative gears which, while reducing the maximum speed to 65 m.p.h., raise the continuous tractive effort to 22 *tonnes*.

The builder of the mechanical parts of all four locomotives is the Swiss Locomotive & Machine Works, Winterthur. All have the same type of body, first seen in the "9200" class of Bo-Bo for the 1,500-V. d.c. lines and continued in the "16000" and "16500" class Bo-Bo locomotives for the Paris-Lille electrification.

Dual-frequency Bo-Bo locomotive No. 30001 *with* 50-*cycle motors*

Rectifier Locomotives

In the rectifier locomotives, Nos. 30003/4, the motor and gearcase together serve as the principal member of the bogie frame. The motor drives through an intermediate gear on each side to the two resilient gear-wheels from which the torque is transmitted to the wheels through cardan shafts concentric with the axles, as in the prototype d.c. Bo-Bo locomotives Nos. 9003/4 and subsequent S.N.C.F. types with this wheel arrangement.

The motor and longitudinals forming the bogie frame are supported on coil springs and linked with the equalising beams by a traction bar on the underside of the motor frame. Side bearers carry a swing link system supporting springs with anti-vibration mountings for the locomotive body. A longitudinal link transfers the tractive forces to the body, and this arrangement, in conjunction with the lateral links, allows relative movement between the bogies and the body without using a conventional bolster and pivot. Weight of the locomotive in working order is 85 *tonnes*.

The electrical equipment of the dual-frequency rectifier locomotives has been supplied by Brown-Boveri A.G., of Baden. The main transformer is rated at 49 M.V.A. on 50 cycles and 32.7M.V.A. on 16 2/3 cycles. A high-tension tap-changer supplies a variable voltage from the auto-transformer winding to a fixed-ratio traction transformer, across the secondary of which two groups of four air-cooled single-anode rectifiers are connected in a bridge circuit having two rectifiers in parallel in each arm. The two motors are connected in series across the rectifier output, but an equalising connection from the mid-point of the motor circuit to a centre tap on the traction transformer gives the arrangement the same characteristics in respect of adhesion as the more familiar rectifier arrangement with motors in parallel. The motors may be short-circuited for pre-heating the rectifiers.

Each motor weighs 6 tons 12 cwt. and is a little more than 5 ft. 11 in. in diameter. It is a 16-pole design with compensating winding and a permanent resistive shunt of the main poles to improve commutation on the rectified supply, which has a ripple of approximately 30 per cent. after smoothing by two chokes of 1·85mH. each. The continuous rating of 2,440 h.p. is given on 850 V., 2,270 A., at 565 r.p.m., corresponding to a locomotive speed of 55 m.p.h. Forced ventilation is provided by two motor-blower sets.

Excitron Type Rectifiers

The eight Brown-Boveri rectifiers are of the excitron type (the arc being maintained continuously) and the assembly has a nominal rating of 3,860 kW. at 850 V., 2,270 A. average. Maximum rectified voltage is 2,000 V. The rectifiers are required to carry overloads of 105 per cent for 2 hr., 130 per cent for 15 min., 160 per cent for 5 min., and 180 per cent for 1 min. Each rectifier cylinder has its own ventilating fan, and these are belt-driven in groups of four by two auxiliary motors. Other small ventilating sets are provided for the transformer radiator and cooling chokes, and for the dry-plate rectifiers supplying auxiliary machines.

The following table compares the specified performances on the two supply voltages and frequencies:—

—	25 kV., 50 cycles	15 kV., 16⅔ cycles
Continuous ratings—		
Horsepower at motor shafts	4,880 h.p.	3,920 h.p.
Corresponding T.E.	14 *tonnes*	14 *tonnes*
Corresponding speed	55 m.p.h.	44·5 m.p.h.
One-hour ratings—		
Horsepower at motor shafts	5,180 h.p.	4,140 h.p.
Corresponding T.E.	16 *tonnes*	16 *tonnes*

All the auxiliaries are driven by rectifier-fed d.c. machines except the compressor, which is powered by an a.c. commutator motor standard with that used for compressor drive in the two dual-frequency locomotives with a.c. motors. There are two tappings on the

Photo courtesy] [*Association Francaise des Amis des C. de F.*

Dual-frequency B-B rectifier locomotive No. 30003

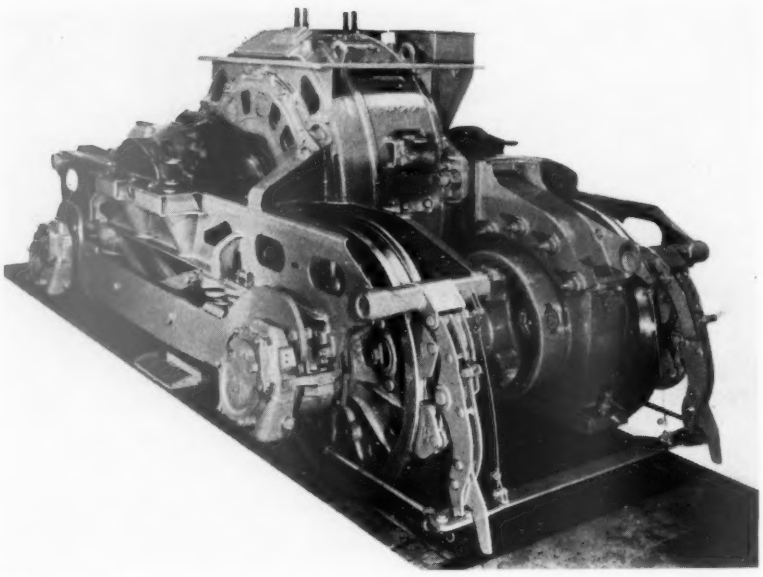


Photo courtesy] [Association Francaise des Amis des C. de F.

Single-motor bogie of rectifier locomotive

auxiliary transformers so that the same voltage is supplied to the auxiliary rectifiers when the input to the locomotive is either 25 kV. or 15 kV. An automatic device selects the tapping appropriate to the input conditions.

The locomotives will haul the same loads on either 25 kV., or 15 kV., although on the latter voltage the balancing speeds are lower. Initial trials of No. 30003 on a gradient of 1 in 92 near Briey (on 25 kV.) produced very high coefficients of adhesion without the use of sand. The figures were above 35 per cent at speeds up to 37 m.p.h., and were as much as 50 per cent from starting up to $\frac{5}{8}$ m.p.h., 46·5 per cent at $12\frac{3}{8}$ m.p.h., and 44·5 per cent at $18\frac{5}{8}$ m.p.h. Performance requirements are that the locomotives should haul a 1,200-*tonne* goods train up 1 in 100 at $37\frac{1}{4}$ m.p.h., and a 650-*tonne* passenger train up 1 in 500 at $99\frac{1}{2}$ m.p.h., both on a 50-cycle input at line voltages ranging between 22·5 and 27·5 kV. Weight of the locomotives in working order is approximately 85 *tonnes*. The locomotives measure 53 ft. 2 in. overall and have a bogie wheelbase of 9 ft. 6 in. Wheel diameter is 4 ft. $1\frac{1}{4}$ in.

The prototype locomotives with a.c. motors, Nos. 30001/2, are the same in external appearance as those just described, but each bogie is equipped with two traction motors driving the axles independently. Mechanical parts have again been built by S.L.M., and the suspension system is similar to that of the pair with rectifiers, but the electrical equipment is by Oerlikon.

Main Transformer

The main transformer is of a new design in which all three limbs of the core carry windings and the central limb has twice the cross section of the other two. On the first limb is wound the tapped auto-transformer winding, while the primary and secondary of the fixed-ratio traction transformer are distributed between the central and third limbs. This arrangement has enabled a core to be built which fits into a rectangular tank with the minimum waste space and makes the best use of the active material. There is a separate secondary winding for auxiliary services, and tappings from the main regulating winding to supply heating.

The traction motors are based on those for the Co-Co locomotives equipped by Oerlikon for the S.N.C.F. 50-cycle electrification in the Savoy. They have 20 main poles, and the interpoles are shunted by resistances when operating on 50 c/s. On $16\frac{2}{3}$ c/s reactances are connected in parallel with the resistive shunts. The double-wound armature comprises two windings connected in parallel, with special equalising connections running between the commutator risers and opposing coils. Characteristics of the machines are as follow:—

—	Continuous		One-hour	
	50 cycles	$16\frac{2}{3}$ cycles	50 cycles	$16\frac{2}{3}$ cycles
Voltage ..	283 V	246 V	283 V	246 V
Current ..	3,500 A	3,500 A	3,760 A	3,760 A
Output at shaft ..	800 kW	786 kW	844 kW	844 kW
Power factor	0·90	0·98	0·89	0·98
Rotational speed	912 r.p.m.	890 r.p.m.	855 r.p.m.	855 r.p.m.

Weight of the motor without gears is approximately 4 tons. The motors are mounted side by side at the centre of the bogies and their pinions drive intermediate gearwheels in a gearcase forming part of the bogie side member. The transmission from the final gearwheels to the axles is by the Jacquemin cardan shaft system. Performance characteristics of the locomotives are given below:—

—	25 kV 50 cycles	15 kV $16\frac{2}{3}$ cycles
Continuous rating		
Horsepower at motor shafts	4,350 h.p.	4,280 h.p.
Tractive effort ..	12·5 *tonnes*	12·5 *tonnes*
Speed	57 m.p.h.	56 m.p.h.
One-hour rating		
Horsepower at motor shafts	4,580 h.p.	4,580 h.p.
Tractive effort ..	14 *tonnes*	14 *tonnes*
Speed	53 m.p.h.	53 m.p.h.
Maximum speed ..	99 m.p.h.	

Except for the transformer oil pump, all auxiliary machines are driven by single-phase commutator motors which are connected to the same transformer secondary winding on either line voltage. The oil pump motor is a three-phase squirrel cage machine with a stator winding supplied through capacitors to provide the necessary phase displacement. It runs at 2,800 r.p.m. on 50 c/s and at 980 r.p.m. on $16\frac{2}{3}$ c/s. A changeover switch is provided for this machine so that it operates at a constant voltage irrespective of the line supply.

NYASALAND RAILWAYS SERVICES DURING EMERGENCY.—At the time of going to press the services of Nyasaland Railways were only slightly affected by the state of emergency in Nyasaland. As a result of intimidation and incitement, practically all African employees at the railway headquarters at Limbe stopped work on March 3, although most staff at outstations remained on duty. Emergency train working was at once introduced. On the following day 90 per cent of the workshop staff returned to work. Other sections had virtually a full staff on duty, and train services returned to normal. There has been very little damage to railway property, and no case of injury to any European employee. Security measures for the protection of lives and property have proved effective, and some agitators have been arrested.

ENGINE CRANKSHAFT AND OTHER FORGINGS TO BE SHOWN AT OLYMPIA.—Mitchell Shackleton & Co. Ltd., Patricroft, Manchester, and the associated company, Clarke's Crank & Forge Co. Ltd., Lincoln, will show examples of rough-machined forgings for turbines and also finished-machined crankshafts at the Engineering, Marine, Welding, & Nuclear Energy Exhibition at Olympia, London, on April 16-30. A special exhibit will display samples of work produced by a recently installed radio-frequency induction-hardening plant, primarily intended for hardening crankshaft journal bearings and crankpins, and claimed to be the largest of its type in the world. The wide range of control enables surfaces of varying hardness and depths of penetration to be obtained down to less than $\frac{1}{32}$ in. depth of hardness zone.

L.T.E. Metropolitan Line Electrification

Extension of electrification from Rickmansworth to Amersham and Chesham

As recorded in last week's issue the London Transport Executive has placed contracts for work at Amersham and other stations as part of the £3,500,000 scheme for electrification and quadrupling the Metropolitan Line. These include a civil engineering contract for earthworks, bridges, and platforms in addition to building contracts for a signal cabin and two substations. This work is being done in connection with the electrification of the 10 miles of line from Rickmansworth to Amersham and Chesham, due for completion in 1960.

In addition to the lengthening of and modifications to the existing platforms at Amersham, Chesham, Chalfont & Latimer, and Chorley Wood, the work includes considerable earthworks, particularly at Amersham where a third through track in the down direction, a freight train refuge loop 1,250 ft. long, and two 450-ft. reversing sidings for London Transport trains are to be installed.

Layout at Amersham

Amersham will become the terminus of Metropolitan Line trains on the completion of the electrification work and the subsequent quadrupling north of Harrow. It will then have three platforms instead of two as at present. The existing down platform is to be widened and made into an island platform. The new side of this island platform will be used mainly by British Railways, who will eventually take over the services to Aylesbury. The other side of the platform will be used mainly by the terminating London Transport trains. The new down platform and the existing up platform will be long enough to accommodate the new British Railways trains which will operate between Marylebone and Aylesbury.

Earthworks

The earthworks at Amersham, where the railway runs practically due east and west, include the widening of both the cutting west of Rectory Road and the embankment between Rectory Road and Station Road to accommodate two reversing sidings between the running lines. This entails the diversion of the existing footpath between the two roads, which run at the foot of the widened embankment. The existing bridges over both Rectory Road and Station Road are being reconstructed and, in conjunction with the Buckinghamshire County Council, the opportunity will be taken to widen both the roads. The existing embankment is being widened on the south side of the railway station to allow for the new down track and platforms and also for a goods refuge loop, capable of holding 50 wagons, engine and brake.

Bridge Reconstruction

The railway bridge over Rectory Road is being widened to take four tracks; the up and down running lines and the two sidings. Apart from rebuilding the existing bridge over Station Road to increase the road width, an additional single-track span is being built across this road for the new down track.

A signal cabin at Amersham is under construction. When completed it will control not only the signalling at Amersham but also, by remote control, that at Chalfont & Latimer Station.

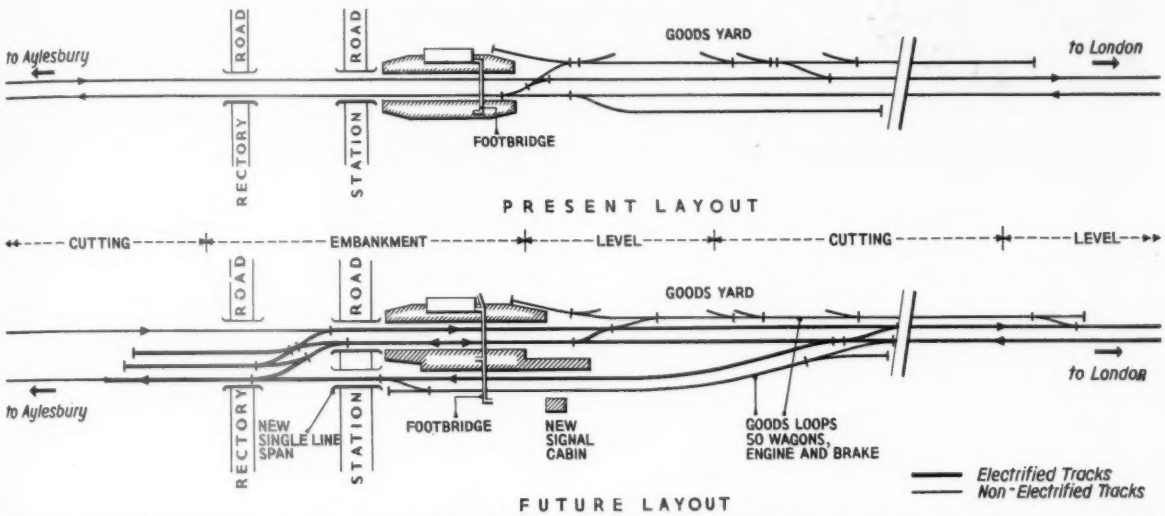
At Chesham, the present single-face platform will be extended at the London end, and widened to form a 230-ft. bay platform on the west side. To do this the cutting has to be increased in width. The new bay track and the existing platform track are to be electrified, with an existing siding on the west side of the goods yard. At Chalfont & Latimer the down platform will be lengthened and an electrified crossover installed to connect the Chesham Branch with the main line.

Work has begun on building the substations at Chorley Wood and near Chalfont & Latimer Station to provide both the 600-V. d.c. traction supply and the signal current.

From 1960 some electric trains will run to Amersham, but the present locomotive-hauled trains will remain in use, continuing the through service from Baker Street to Aylesbury. Locomotives will continue to be changed at Rickmansworth, as now, to obviate the expense of providing locomotive-changing facilities at Amersham which would be needed for a year or two only. Trains to Chesham will be electrically operated throughout.

Before the full electric service terminating at Amersham can be introduced, the quadrupling of the line between Harrow and Watford South Junction, where the Watford branch diverges, must be completed. The work of installing these extra tracks should be completed in the summer of 1962.

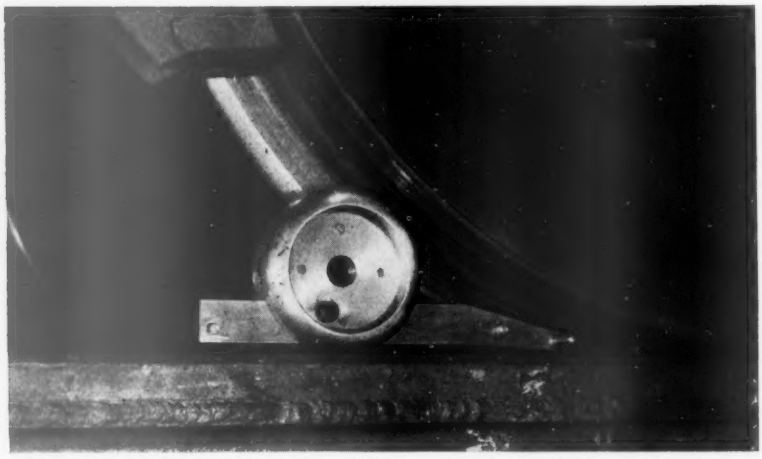
The work is being carried out under the general direction of Mr. C. E. Dunton, Chief Civil Engineer, London Transport Executive.



Present and future layout at Amersham Station, showing new electrified tracks and platform extension for British Railways Marylebone-Aylesbury trains

Measuring Diameter of Wheels on Rail

Gauge developed by L.T.E. for use with ground-wheel lathe



Gauge positioned against wheel on rail

TO overcome problems of measuring wheel diameters of railway rolling stock being machined by a ground-wheel lathe, the mechanical engineering staff of London Transport Underground have developed a gauge which measures wheel diameters by reference to a small arc of the circumference.

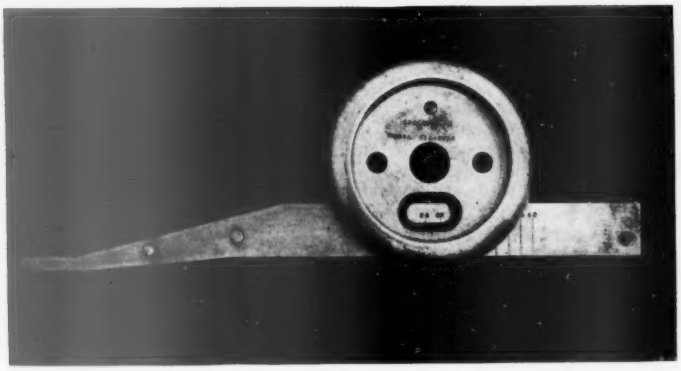
In 1956, a new ground-wheel lathe was installed at the L.T.E. Neasden Depot. Developed from an earlier experimental lathe brought into use at Golders Green Depot in 1947, this permits the flanges of train wheels to be machined in situ. There is no need to remove the defective wheels or even to uncouple the car from the remainder of the train. The lathe was designed by London Transport staff in collaboration with the Scottish Machine Tool Corporation, by which the lathe was afterwards built.

One difficulty experienced was that the close fit of the wheels in the bogies and the positions of the brake blocks, made impracticable the use of conventional gauges for measuring the diameters of the wheels to be turned.

Sliding Roller

The gauge consists of a graduated beam $11\frac{1}{4}$ in. long made from gauge steel and fitted into a slot in a steel roller, 4 in. in diameter. The roller does not rotate and the beam can slide in the slot. By means of a locking screw the beam can be fixed to the roller in any position along its length. Part of the face of the roller has been cut away along the slot to expose the graduations on the beam, which are indexed against a fixed mark on the vertical centre line of the roller.

To determine the diameter of a wheel, it is necessary only to lay the roller and beam on the running rail adjacent to the wheel in question. After loosening the lock screw, the beam and roller are pushed forward until they both make contact with the wheel. The locking screw is then tightened and the diameter of the wheel read directly off the scale. Locating dowels positioned to register against the flange of the wheel ensure that the tyre diameter is always measured at the same distance from the flange.



Wheel-diameter gauge showing graduations on beam, which is fixed by locking screw whilst readings are taken

Diameter of the wheel can be read directly off the gauge

C.T.C. Extensions in Spain

(*Concluded from page* 298)

is to raise this figure substantially by improving facilities which, as the traffic is increasing in any case, should bring a load of 1,000,000 *tonnes* in two or three years' time.

To accelerate the traffic flow C.T.C. is to be installed between Valencia and Castellon, Tortosa and Tarragona and from a point a little to the north of Barcelona to Port Bou, in some cases covering sections of parallel route.

Automatic track circuit signalling has been in service on certain sections of this coastal route for many years. At first three-position electrically worked semaphores were used, but the later installations included colour-lights

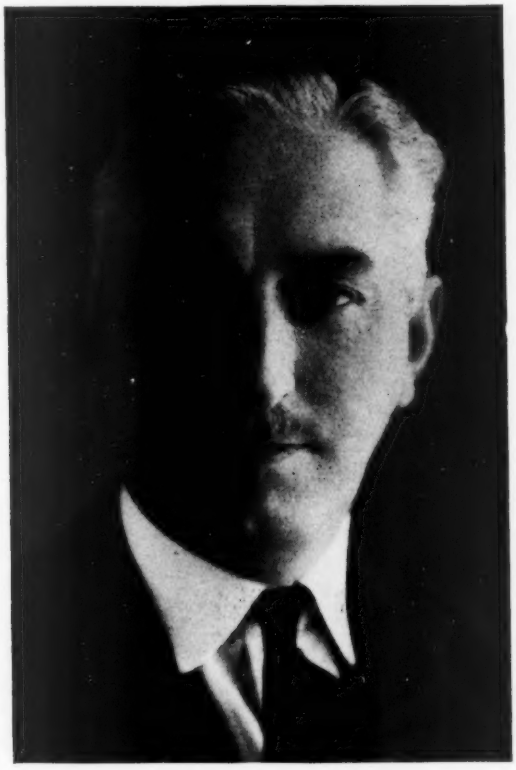
WESTERN REGION CAR TOURIST SERVICES.—The Western Region of British Railways will this year again operate car tourist services between Paddington and Newton Abbot and from Paddington to St. Austell, each weekday during the period March 25 to October 10, 1959, inclusive, except Good Friday and Easter Monday. Return charges between Paddington and Newton Abbot for car and driver are £10 17s. 6d. first class, and £9 7s. 6d. second class. The return fare for each additional adult passenger is £4 16s. first class and £3 4s. second class. Return rates from Paddington to St. Austell for a car and driver are £13 10s. first class and £11 second class. The return fare for each additional adult passenger is £6 11s. 6d. first class and £4 7s. 8d. second class.

RAILWAY NEWS SECTION

PERSONAL

Mr. I. A. Abbasi, formerly Chief Operating Superintendent, of the North Western Railway of Pakistan, recently has been appointed General Manager of the Eastern Bengal Railway. He also becomes General Manager (Port) and Chairman Port Commissioners, Chittagong. He succeeds Mr. M. A. Bary, who has retired from these positions.

Major-General W. D. A. Williams
Appointed Principal of the B.T.C. Staff College



Mr. J. R. Hammond
Appointed General Manager of the Western Region

Major-General W. D. A. Williams, C.B., C.B.E., Commissioner for Transport, East African High Commission, who, as recorded in our November 21 issue, has been appointed Principal of the British Transport Staff College for Higher Management, Woking, was educated at Brighton College, the Royal Military Academy, Woolwich, and Emmanuel College, Cambridge. In 1924 he obtained a B.A. First Class Honours Mechanical Sciences Tripos. He was also a graduate of the Staff College, Camberley, 1932-33. He was commissioned in the Royal Engineers, in 1917, and, during his military career, had experience with the Campbell Gas Engine Co. Ltd., Metropolitan Vickers Co. Ltd. and Messrs. Kennedy & Donkin. From 1928 to 1938 he served mainly with the Works Services in Burma and England. He was responsible for the supervision of three major construction schemes, including the Royal College of Military Science. In 1938 Major-General Williams was appointed to the newly-formed General Staff Planning Branch at the War Office. On the outbreak of war he took charge of the branch responsible for the Freight Movement of the Army. In 1943, he became Director of this organisation, with the rank of Acting Major-General. In 1946 he was appointed Director of Movements. War Office, as substantive Major-General, and held this appointment until his retirement in 1949. From 1949 to 1954 Major-General Williams was employed with the Ministry of Transport & Civil Aviation as Chief of the Port Emergency Planning Staff. Since 1954 he has been the Commissioner for Transport in the East Africa High Commission.

Mr. W. B. Carter, District Commercial Manager, Derby, London Midland Region, British Railways, is retiring at the end of this month, after nearly 50 years' service.

Sir Stephen Luke, Controller of Development & Welfare, West Indies, will succeed Sir George Seel when he retires, as Senior Crown Agent for Oversea Governments & Administration, at the end of this month.

We regret to record the death, at the age of 80, of Lt.-Colonel Sir Maxwell Hicks, Chairman of McNamarra & Co. Ltd., until its nationalisation in 1948. He was also a director, at that time, of Fred Cook (Transport) Limited, Hull.

Mr. F. W. Beal has been appointed Assistant to the General Passenger Traffic Manager, Canadian National Railways. He was formerly Staff Assistant.

Mr. J. R. Hammond, M.B.E., B.Sc. (Eng.), A.M.I.C.E., Assistant General Manager (Modernisation), Western Region, British Railways, has been appointed General Manager. He is 46 and joined the G.W.R. as a surveyor and draughtsman in 1937. Previously he was a pupil of the Company's Chief Engineer, Mr. Raymond Carpmael, engaged on new works schemes. He was for a time loaned to the Ministry of Aircraft Production. Mr. Hammond returned to the office of the Chief Engineer in February, 1941, and became Resident Engineer of several works carried out as war measures. In October, 1942, he joined H.M. Forces, and attained the rank of Major. He was awarded the M.B.E. (Military Division) and mentioned in despatches during service in Italy. Mr. Hammond returned to the G.W.R., in February, 1946, as Assistant in the Divisional Engineer's Office, Bristol. He was transferred to Neath, as Assistant Divisional Engineer, in 1947, and in 1948, moved to the Chief Engineer's Office at Paddington, as Personal Assistant to the Chief Engineer. Three years later he became Assistant District Engineer, Newport. In 1952 he was appointed District Engineer at Cardiff and transferred, in 1953, to a similar position at Wolverhampton. In

January, 1957, Mr. Hammond became Assistant to the General Manager (Modernisation), and was re-designated, a year later, as Assistant General Manager (Modernisation).

Mr. M. G. Burrows, M.I.Mech.E., M.I.Loco.E., Chief Mechanical & Electrical Engineer (Designate), North Eastern Region, British Railways, has assumed responsibility for carriage and wagon matters in the North Eastern Region. He moved a year ago, from the Southern Region, where he was Mechanical Engineer. Mr. Burrows was educated at Lancing College, and joined the Great Western Railway in 1920 at the Swindon Locomotive Works. Later he gained experience in the testing house and drawing office. In 1934 he joined the staff of the Chief Mechanical Engineer, London Midland & Scottish Railway, being appointed Mechanical Inspector in 1935. In 1938 Mr. Burrows became Assistant to the Works Superintendent, Horwich Locomotive Works and was made Assistant Works Superintendent there in 1942. From 1944 to 1946 he was Acting Assistant Works Superintendent, Crewe Locomotive Works, and was appointed Assistant Works Superintendent at Derby Locomotive Works in 1946. In 1948 he became Assistant (Locomotives) to the Chief Mechanical Engineer, Southern Region, and a year later was appointed Assistant Mechanical Engineer. He held this position until 1956, when, under the reorganisation of the Chief Mechanical & Electrical Engineer's Department, he was appointed Mechanical Engineer, Southern Region, the position he vacated on appointment to the North Eastern Region.

We regret to record the death, on March 5, in his 70th year, of Mr. W. Cyril Williams, F.R.G.S., A.M.Inst.C.E., M.I.Mech.E., M.I.Loco.E., M.Inst.T., a director and former Sales Director of Beyer Peacock & Co. Ltd., and Past-President of the Institution of Locomotive Engineers. Mr. Williams began his railway career, in 1906, as an apprentice to the Natal Government Railways, where his training, apart from the general workshop course, included running shed, signal department, footplate, and drawing office experience. He attended the Durban Technical Institute, obtained the Abe Bailey Scholarship in 1909, the James Brown Exhibition in 1910, and the Institute Scholarship in 1911. For a short period he was a lecturer at the Institute. In 1913 Mr. Williams was appointed a junior engineer to the Chief Superintendent of Motive Power at Johannesburg. During the 1914-18 war he was commissioned in the South African Engineer Corps and served throughout the campaign in German South West Africa, with the rank of Captain, in the Railway Regiment. During this time he was Locomotive Foreman at Usakos and later held the rank of Assistant Superintendent (Mechanical) at Keetmanshoop. Following the campaign in South West Africa, he was posted to France in the Royal Engineers, being promoted in the field to Army Locomotive Superintendent, Second Army Light Railways. In 1919, Mr. Williams went to the United States and Canada on behalf of the South African Railways, where he was responsible for the inspection of locomotives, wagons, and other railway equipment. The following year he returned to London and, for a short time, was Acting Advisory Engineer to the South African Railways. He eventually returned to duty in South Africa on the staff of the Assistant General Manager in Durban. He joined Beyer Peacock & Co. Ltd. in 1923 as London Representative and in that year opened its London Office and subsequently became London Manager. Later he was designated Sales Director of the company and, in 1945, was elected to the board. He was a pioneer in the promotion of British export trade, particularly in locomotives, and was an enthusiastic advocate of the advantages to be obtained by the introduction of the Garratt type of locomotive. He took a large part in the successful development and use by many railways throughout the world of this type of locomotive. During the 1939-45 war his wide experience and knowledge of overseas railways was drawn on by the War Office and the Ministry of Supply and he actively participated in the work of his company on important armaments and locomotive production for the campaigns during that period. In the course of his duties, he travelled on railways in all parts of the world, including the whole of the African and South American continents, where he visited Ecuador, Colombia, Argentine, Chile, and Brazil. He went also to Iraq, India, Burma, Australia, New

Mr. M. G. Burrows
Chief Mechanical & Electrical Engineer, North Eastern Region

The late Mr. W. Cyril Williams
Director of Beyer Peacock Co. Ltd., 1945-59

Mr. T. A. Hooker

Appointed Development & Research Officer London, C.N.R.

Zealand, Turkey, Russia, Iran and most countries in Europe. His journeys included trips through Africa and South America over sections where the railway subsequently followed. His wide knowledge of railways was well known and he made many contributions to the technical press and in papers read before the Institution of Locomotive Engineers, of which body he was President for 1949-50. The funeral took place at Putney Vale Crematorium, yesterday, March 12.

Mr. T. A. Hooker, Industrial Agent in England, Canadian National Railways, who, as recorded in our January 23 issue, has been appointed Development & Research Officer, London, was born in 1889. Mr. Hooker graduated at London University, in 1923, after a four year course at the London School of Economics. The course included a year's travelling scholarship to India and the Far East, to study transportation problems. He joined the Canadian National Railway in 1923, and, until 1930, assisted in the operation of the Canadian Government Merchant Marine fleets between Eastern Canada, the Pacific Coast and the United States. In 1930, after study of the Canadian industrial conditions, he was appointed the first representative in London of the then newly-formed Department of Research & Development. During the 1939-45 war he was concerned with the transatlantic shipping for the Canadian Government Merchant Marine. In 1945 he resumed his previous appointment in the Research & Development Department. He covers industry in Britain and on the Continent.

Mr. Frank Morris, Chairman of the Herbert Morris Group, has been appointed Chairman of British Monorail Limited. Mr. E. Russell and Mr. G. Randsley, members of the board of Herbert Morris Limited, have also been appointed directors of British Monorail Limited. Mr. James Dallas continues as Managing Director of British Monorail Limited. These changes follow the acquisition of the British and American shares of British Monorail Limited by Herbert Morris Limited, as recorded in our issue of March 6.

Mr. W. A. Hissey has been appointed a Principal Executive Assistant, London Transport Executive, with the title of Principal Assistant (Methods & Incentives).

Mr. F. R. Griffith, Acting Assistant (Cartage) to the Commercial Officer, Western Region, British Railways, has been appointed Assistant to the Commercial Officer (Freight Research).

Mr. P. F. Grant, Senior Assistant to the Regional Accountant, Paddington, Western Region, British Railways, has been appointed Assistant Regional Accountant, North Eastern Region, York.

Mr. F. P. B. Taylor, General Assistant to Commercial Officer, Waterloo, Southern Region, British Railways, has been appointed Commercial Officer, in succession to the late Mr. G. Wynne Davies. A picture and biography of Mr. Taylor was published in our issue of December 19, 1958, when he was appointed to the position he now relinquishes.

Mr. M. R. Pierson, Assistant for Locomotives & Diesel Electric Multiple Unit Stock (Maintenance), Southern Region, British Railways, has been appointed Maintenance Engineer (Rolling Stock), Chief Mechanical & Electrical Engineer's Department, London Bridge. He succeeds Mr. F. T. Muncey, who is retiring.

The Institution of Locomotive Engineers

The following names have been entered on, or transferred in, the register of members of the Institution of Locomotive Engineers:—

Associate Members

Mr. H. Green, Design Section Leader, Transmission Drawing Office, Ruston & Hornsby Limited.

Mr. T. H. Hill, Distribution Engineer, C.M. & E.E.'s Department, London Road, Manchester, London Midland Region, British Railways.

Mr. A. Kitching, Assistant Works Manager, Hudswell Clarke & Co. Ltd.

Mr. K. D. S. Tyler, Chief Technical Assistant, Railway Traction Department, Rolls Royce Limited.

Associates

Mr. H. E. Price, Local Director, Vehicle Equipment, Dunlop Rubber Co. Ltd.

Mr. E. S. Simpson, London Manager of the Jonas Woodhead Group.

Mr. J. K. Thomas, Principal, British Railways Staff Training College, Derby.

Mr. H. C. W. Westwood, Director & Deputy General Manager, Pressed Steel Co. Ltd.

Mr. R. C. Whalley, Assistant Commercial Manager, Vulcan Foundry Limited.

Graduates

Mr. T. E. Scott, Graduate Mechanical Engineer, British Railways Western Region, Swindon, Wiltshire.

Mr. G. A. Yeomans, Draughtsman Trainee, C.M. & E.E's Department, Derby, L.M. Region, British Railways.

Student

Mr. C. Clayton, Fitter-Turner Apprentice, Locomotive Works, Derby, British Railways.

Transfers Associate Member to Member

Mr. H. J. L. Dolan, Mechanical Engineer, Rhodesia Railways.

Mr. J. P. Metcalfe, Managing Director, Davies & Metcalfe Limited.

Transfer Graduate to Associate Member

Mr. R. C. Tandon, District Mechanical Engineer-in-Charge, Wagon Erection Plant, Waltair, South Eastern Railway, India.

Mr. F. H. Jaekel

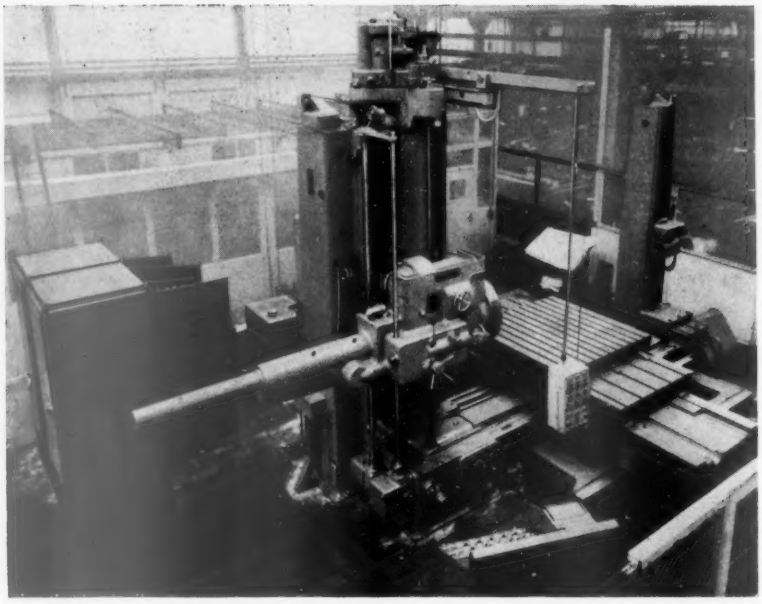
Appointed Deputy Chief Superintendent (Traffic), Nigerian Railway

Mr. F. H. Jaekel, M.I.Mech.E., M.I.Loco.E., M.Inst.T., Deputy Chief Superintendent (Power), Nigerian Railway, who, as recorded in our February 27 issue, has been appointed Deputy Chief Superintendent (Traffic), was born in 1913, and was educated privately and at St. Albans School. He was apprenticed to the London Midland & Scottish Railway at Derby Shops, during which time he studied at Derby Technical College. After a period with the Research Office, he became an improver in the Motive Power Department at Rugby, Crewe, and Euston. Later he trained with the Chief Operating Manager's Department. In 1937, he was appointed an assistant engineer (Overseas) to the Asiatic Petroleum Company but left, and, after a short spell as Locomotive Draughtsman with Coras Iompair Eireann, was appointed Draughtsman & Instructor to the Nigerian Railway in 1938. He was promoted to be Assistant District Running Superintendent, Grade 1, in 1946, and was posted to Zaria. In 1947, he became Senior Assistant Locomotive Superintendent and transferred to Enugu. He was appointed District Locomotive Superintendent in 1949. Mr. Jaekel took charge in the Northern District, when the duties of the District Traffic and District Locomotive Superintendents became merged during a reorganisation. He subsequently became Assistant Chief Superintendent (Power), a position later re-designated Deputy Chief Superintendent (Power). During the 1939-45 war, Mr. Jaekel served with the 3rd West African Field Company, attaining the rank of lieutenant before returning to railway service in 1942. In 1950, he represented the Nigerian Railway at the Colonial Office Conference on Standardisation of Railway Equipment.

Mr. H. G. Stage, Oversea Marketing Manager, and Mr. F. Tompkins, Home Sales Manager, have been appointed Directors of Nu-Swift Limited.

Mr. K. C. Molloy, head of the Gas Cleaning Division, and Mr. J. Dunning, Works Manager, have been appointed Directors of the Sturtevant Engineering Co. Ltd.

NEW EQUIPMENT AND PROCESSES



Electronically-Controlled Universal Boring and Surfacing Machine

THE speed of setting and high degree of accuracy possible with electronic control are clearly demonstrated in a heavy capacity universal boring and surfacing machine shortly to be installed at the Rugby works of the British Thomson-Houston Co. Ltd. Before this installation, the machine is being exhibited on the British Board of Trade stand at the National Industrial Production Show in Toronto.

The machine, also equipped for milling, drilling, tapping, and screwcutting, is intended for the single or batch production of components up to five tons in weight. The 4-in. dia. boring spindle, driven by a 15 h.p. motor, provides 32 speeds ranging from 4 to 700 r.p.m. The built-in facing chuck, which will face up to 42 in. dia., provides 24 speeds. Maximum traverses are: longitudinal, 5 ft., transverse, 8 ft., and vertical, 7 ft. Table traverses are infinitely variable from 0·5 in. to 10 in. per min., with a rapid traverse of 120 in. per min.

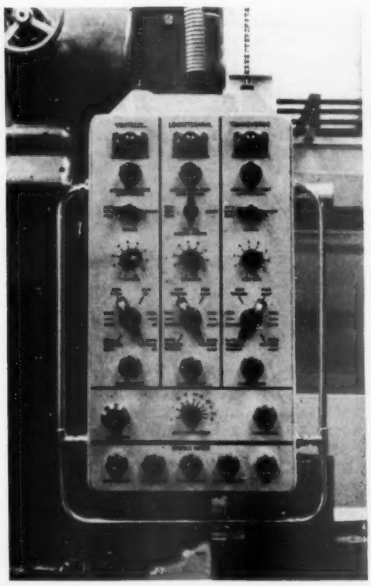
Two essential requirements with any form of automatic positioning control are that the slip-stick characteristics of the slides must be reduced to an absolute minimum and the table clamping must be achieved without disturbing the accuracy of the setting. To reduce slip-stick, each slide is carried on four rollers mounted on eccentric pivots. The roller is attached to the hub by a bonded rubber sleeve and needle roller bearings are fitted. By means of the eccentric mounting, the rollers are adjusted to lift the weight of the table clear of the slides. Pressurised lubricant is forced into the clearance gap through suitably-positioned channels and the component weight is thus carried on a film of oil. A special lubricant is used and the pump is switched on only when the table is in motion. Automatic hydraulic clamping by Keelavite Limited is used to clamp the table after positioning and, to ensure that no movement occurs during the operation, a low friction plastic P.T.F.E. material is applied to the working surfaces of the locking wedges.

The electronic automatic co-ordinated setting equipment is designed and manufactured by the British Thomson-Houston Co. Ltd. The main controls are grouped in a desk-type cubicle and on the machine is the operator's pendant-type control. From the component drawing the planning department or supervision decides the sequence of operations. The horizontal and vertical co-ordinates of each bore and the boring depth then is transferred to a set of punched cards. These are placed in the card-reading section of the cubicle. On the desk six dials are provided for each of the three ordinates, to set up any required displacement of the table in tens of inches, inches, and four decimals, from any predetermined datum. If punched cards are not used, the dials can be set by hand. Following the reading of the card the respective traverse motor automatically positions and locks the table, the exact alignment being shown on a large-scale coincidence meter on the desk. The card for this co-ordinate then is rejected and the sequence repeated for the next card.

Measurement of the table position during travel is by electro-magnetic sensing head. This passes over a series of blocks spaced at exact 1-in. intervals in a heavy section cast-iron bar running along the bed. Each block has a ¾-in. dia. non-magnetic insert. The position of the sensing head in relation to the centre of the insert provides the required variation in the signal impulse for motor control. Any wear of the lead screw thus has no effect on the positioning control. A fast traverse is used until the exact position is nearly reached, an automatic change-over then being made to slow traverse.

This control system does not enable an unskilled operator to undertake precision boring, but it does eliminate the use and storage of jigs, fixtures, and measuring equipment. Maintenance is claimed to be relatively simple and can be carried out by electricians without previous electronic experience, using a standard fault-finding code.

The makers are H. W. Kearns & Co. Ltd., Broadheath, nr. Manchester. A similar machine is being built and will be exhibited at the September Paris Machine Tool Exhibition.



Stretcher/Ladder Hire Service

THE Gloster Stretcher/Ladders described in this section in our January 9 and February 27 issues, now are available on monthly hire at a charge of 10s. 6d. each,

payable in advance against advice of readiness for despatch.

Hiring normally will be for an initial period of 12 months, but shorter periods will be considered.

Adaptors can be hired for 3s. per pair per month. Hiring can be continued indefinitely or 75 per cent of hiring fees could count toward purchase price.

This hire service is applicable only in the United Kingdom.

Enquiries should be made from Mr. P. J. D. Hoffman, Manager, Stretcher/Ladder Hire Division, J. Nesbit-Evans & Co. Ltd., St. Oswald's Road, Gloucester.

Power Mechanism for Track Section Isolators

THE TS track section isolators newly developed by Switchgear & Equipment Limited and ordered in quantity by the British Transport Commission for British Railways may be hand- or power-operated. The power mechanism type S3M has been developed especially for use with these isolators.

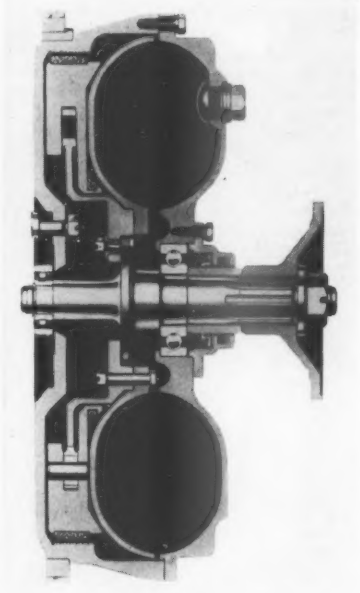
The mechanism comprises a spring sufficiently powerful to operate the isolator under all conditions and driven by an electric motor. When operation is initiated, the motor winds up the spring which does not release its energy to drive the isolator until it has reached a predetermined energy potential.

This arrangement prevents mal-operation if power should fail. Unless the spring is fully charged, no operation will take place. The mechanism can be controlled remotely, and provision is made for interlocking with other apparatus. Emergency hand operation is possible.

Further details can be obtained from the manufacturer, Switchgear & Equipment Limited, Banbury, Oxon.

Automatic Fluid Friction Clutch

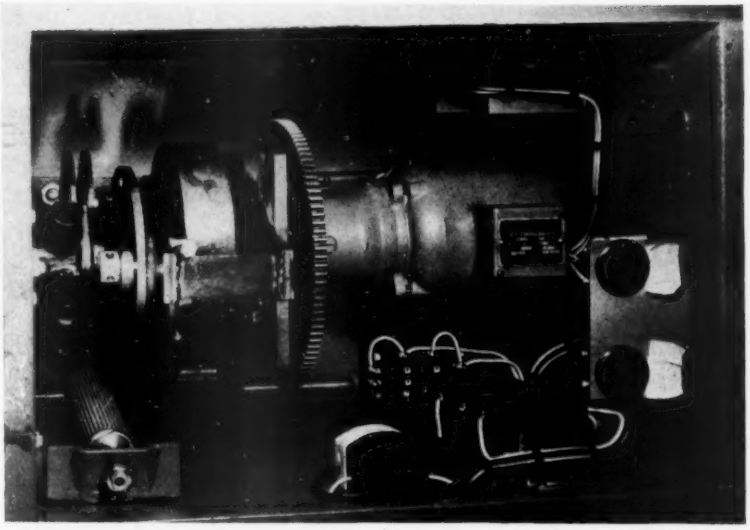
THE Fluid Friction Clutch has been developed to overcome the characteristic difficulties of fluid drive. The clutch embodies a fluid coupling and centrifugal clutch in one housing. On attainment of a predetermined speed of rotation, the clutch is operated automatically to afford a direct drive between the driving and driven members, thereby cutting out the hydraulic coupling operation from the transmission.

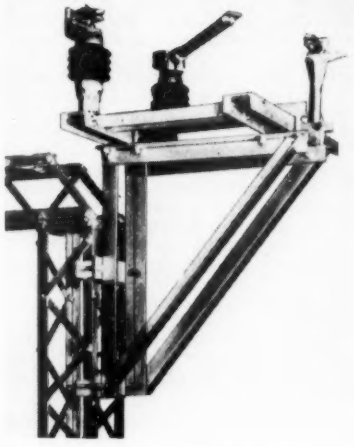


In combining the fluid and centrifugal couplings use has been made of the best features of each type. The fluid coupling deals with the requirements of smooth take-up from rest, while the centrifugal element ensures positive grip of the friction members at high speeds, although moving parts are relatively light. The manner of their combination also ensures normal over-run braking and ability to re-start the engine when coasting.

The volume of fluid in the vane-type coupling is about one-third less than normal because of a reduction in section to afford space between the runner and the inner face of the flywheel proper. In this space is a dished star member attached to the output shaft, and carrying four brake shoes with friction-material facing. A garter spring holds the shoes in the retracted position when the output shaft is at rest. Full engagement of the drive can take place when the shaft is rotated only by movement of the final transmission. By the same means, engine braking is retained down to idling speed.

The transfer of kinetic energy is less for any given speed because of the reduced volume of fluid, and idling drag is stated to be lower. The centrifugal clutch member compensates for the lower total torque transmitted by the fluid coupling at high speeds.





In action, acceleration of the engine produces automatic take-up through the fluid coupling with maximum smoothness. As the output shaft speed rises, the friction clutch shoes are thrown outward by centrifugal action so that contact with the flywheel drum is established. From this point the transmission efficiency of the fluid coupling ceases to be of great consequence because rising speed of the runner shaft results in the drive being taken over fully by the centrifugal component.

An interesting detail of the design is that the centrifugal element is incorporated without increasing the overall thickness of the flywheel assembly. This allows the unit to be accommodated in a standard layout without any change or re-positioning of chassis components.

Further details may be obtained from the manufacturer, Self-Changing Gears Limited. Laythalls Lane, Coventry.

Portable Conveyor

A NEW portable conveyor consists of a 6-in. dia. one-piece galvanised metal tube carrying a rotating Archimedes screw. This is driven by vee belt from a pulley on an electric motor or petrol engine fitted at conveyor head or on a special mounting on a carriage.

Granulated material, wet concrete, and liquid slurries can be handled by the conveyor. Capacity is 30-40 ton per hr. or 38-40 cu. ft. per min. depending on materials involved, angle of use, and rate of feed.

The following models are available. All-purpose model, suitable for permanent or semi-portable installations. Supplied in lengths of 11 ft., 16 ft., 21 ft., 27 ft., 34 ft., and 41 ft. Motive power is fitted at the head of this model.

Standard model, in lengths of 21 ft., 27 ft., 34 ft., and 41 ft., fitted on a two-wheel carriage giving complete portability. Angle of working is readily adjustable by winch. Motive power is fitted by bracket to the carriage.

Hi-Lift model, in lengths of 21 ft. and

27 ft. Specially adapted to operate at elevations up to 70 deg.

Extra-heavy models can be supplied, and the conveyor is available also in 16 ft. and 21 ft. lengths as a truck auger.

New features have been protected by 14 patent applications and three registered designs. Foreign patents are pending in all important overseas markets. Prices range from £45 upwards exclusive of motor.

Further details can be obtained from the distributor, Gordon Felber & Co. Ltd., Spirella House, Oxford Circus, London, W.1.

Stud Welding

THE TRS 3 is a new unit providing d.c. power for all types of Crompton Parkinson stud welding equipment handling ferrous attachments up to and including ⅜ in. dia.

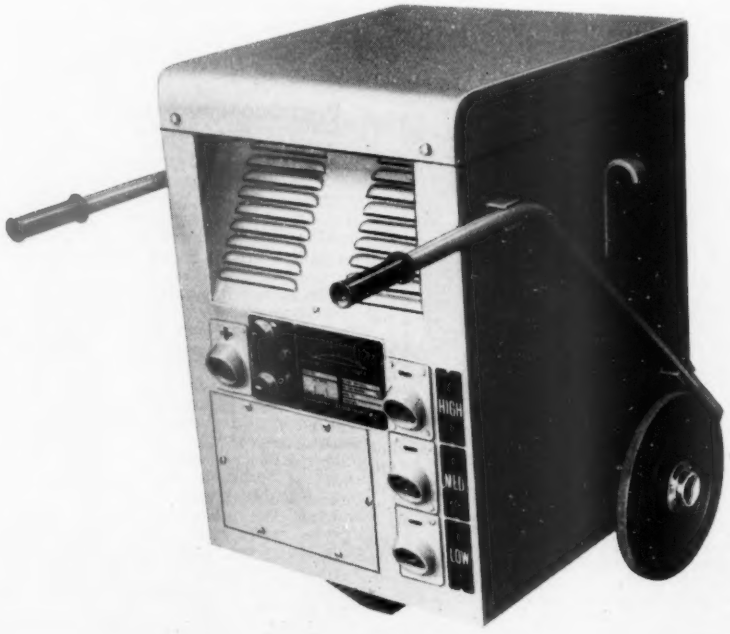
Another version of this unit is the TRS 3C, comprising a standard TRS 3 with an inbuilt C type regulator. This is suitable for full ferrous and non-ferrous stud welding over the same range of stud diameters.

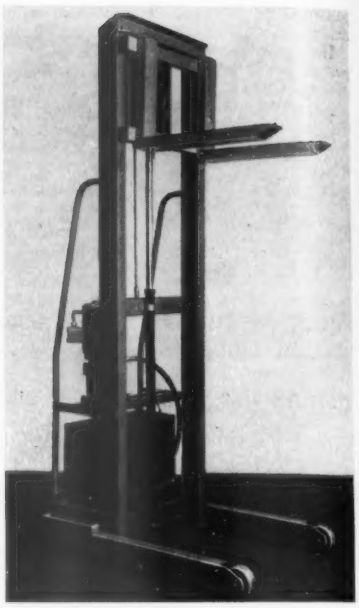
The larger units in the range are dual-purpose machines which, while primarily intended for stud welding, also are suitable for arc welding. They are almost noiseless in operation and possess superior voltage current characteristics giving improved arc stability and rapid voltage recovery; adjustment may be made for input voltages ranging from 360-440 V. in 20-V. steps.

Advantages claimed for use of this equipment are as follow:—factor on load and electrical efficiency are high; running costs are low. The units are robust, drip-proof, and fully mobile. A special unit can be supplied for use in the tropics.

Price of the TRS 3 unit is £194 10s., the unit weighs 415 lb., has a length of 41 in., a width of 28 in., and a height of 34½ in.

Further details can be obtained from the manufacturer, Crompton Parkinson Limited, Crompton House, Aldwych, London, W.C.2.





Elevator Truck

THE "Vertolifter" range of hydraulic elevator trucks has been augmented by 1,200-lb. and 1,600-lb. capacity models. Handling lifts to 60 in. and 75 in., the machines can be fitted with fixed or laterally-adjustable forks and detachable platforms.

Operation is by hand-pump, battery, and mains electric. Construction is of heavy-gauge steel. All moving parts have ball or roller bearings.

The trucks are suitable for lifting, stacking, loading, and general stores use. Further details can be obtained from the manufacturer, Powell & Company, Burry Port, Carms., South Wales.

Hand Cleaner Dispenser

ADVANTAGES claimed for the Spenso dispenser are: elimination of waste, drips, and pillering; easy filling, and competitive price. Further details can be obtained from Deb Chemical Proprietaries Limited, Forfar Chemical Works, Belper, Derbyshire.

Ministry of Transport Accident Report

Maze Hill, July 4, 1958: British Railways, Southern Region

Brigadier C. A. Langley, Chief Inspecting Officer of Railways, Ministry of Transport & Civil Aviation, inquired into the accident which occurred at 10.25 a.m. on July 4, 1958, at Maze Hill, when the 9.41 a.m. four-coach electric train, Gravesend Central to Charing Cross, ran by the home signal at danger and collided head on at about 25 m.p.h. with a nine-coach empty steam train being shunted across the up line towards the down. (The train left Gravesend with 10 coaches but six were detached at Slade Green.)

When the motorman saw the obstruction his train was running at about 40 m.p.h. The impact drove the empty train back 11 yd. and lifted the engine, which mounted the leading coach of the other train. Both lines were blocked and current was cut off by the heavy short circuit. Of some 50 passengers, 43, with motorman and guard, were taken to hospital, where five were detained, but none was seriously injured. The men on the engine jumped off in time. Assistance quickly arrived and there was no delay in the rescue work.

volved in the accident had passed at 10.3 a light engine was accepted from Charlton and arrived at 10.7. A down train passed at 10.13 and the engine was then shunted to the down line through points 18 and then again through them and points 15 to the empties in No. 1 up sidings. Points 18 were then re-set—but not points 15, on the London end of which the engine was standing—and a down train was accepted. This passed at 10.23. The train which overran the home signal had been accepted at 10.16, but as it was not due to leave Maze Hill until 10.27 the stationmaster and signalman decided to move the empties across to the down line directly after the down passenger train had gone, whence it would be shunted in due course to the down bay, before the following down train, due to arrive at 10.34, would need accepting. (This train had to be diverted.) Points 18 were accordingly once more reversed and the empty train was making the first of these intended movements, protected by signals 29 and 20, when the collision occurred.

accident occurred two minutes before the colliding train was due to leave Maze Hill.

The man in charge of the shunting explained how he coupled the engine, attended to the vacuum train pipe connection and took off the hand brake. He told the signalman the train was ready to leave and when shunt signal 13 was cleared gave a hand signal to it; it began to move and was, he thought, travelling at about 3 m.p.h. when the collision occurred.

The driver of the engine, a passed fireman, said he first saw the electric train about half way from the overbridge, closed the regulator and applied the brake; he told the fireman to jump and followed suit.

The fireman confirmed this and said that after the accident he went to see if he could do anything for the motorman, whom he found sitting on the bogie frame below the cab; he helped him to the ground. The motorman did not speak to him. He also helped some passengers out of the train.

A lineman, with two others, went to the

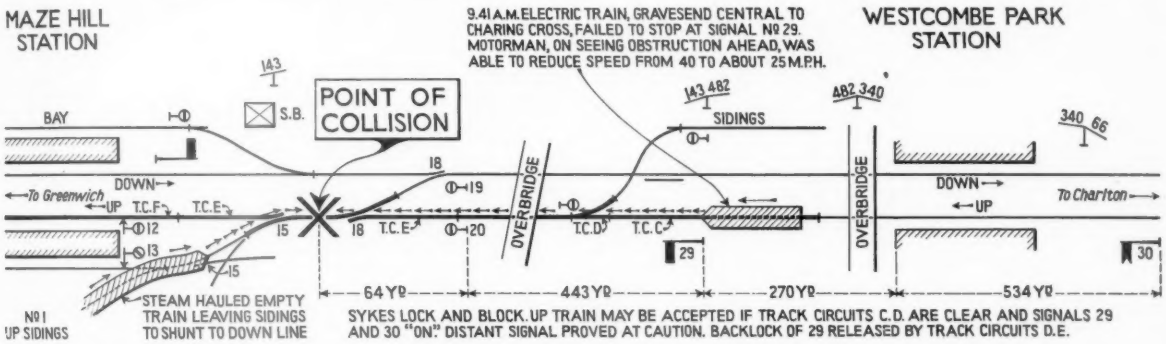


Diagram showing circumstances of accident at Maze Hill, British Railways, Southern Region, July 4, 1958

The lines were reopened for traffic at 7.54 p.m. It was fine and clear with dry rails. The accompanying diagram shows the lines, signals, etc., essential to an understanding of the case.

Layout and Signalling

Sykes lock-and-block is in operation. The up home signal, No. 29, is over 500 yd. from the signalbox; a bridge abutment and curvature prevent it from being seen from the four-car stopping mark at Westcombe Park station (see plan) but it comes into view at the six-car mark and is in full view for 270 yd.; it is well sited, with a good background. Trains may be accepted up to this signal if track circuits C and D are clear, which allows an overlap of 433 yd., and in these circumstances shunting from the up to the down sidings through points 15 and 18 is permitted under the protection of the home signal and ground signal 20, both then held at danger by the interlocking.

Course of Events

The line carries a heavy traffic, with 65 up and 78 down trains on a week-day, with peak of six up and eight down in one hour during the morning rush. The carriage sidings are used for spare coaches, mostly steam stock, normally required only for week-end working and special trains. As soon as the up train preceding the one in-

The stationmaster explained how empty stock movements often had to be made, selecting suitable opportunities between trains, and detailed the discussion he had with the signalman. They decided to make the movement when they did, if necessary delaying the up train a little, after considering all the circumstances. After this the stationmaster remained in the box to prepare details for the week-end work. The up train was accepted in the regular manner and a temporary porter, in charge of the shunt, gave a hand signal to the steam engine driver, who had moved the empties about three coach lengths when the stationmaster saw the oncoming train and called out to the signalman that it was running by. He saw the enginemen jump off a second or two before the impact. He checked the positions of the signal and point levers and the condition of the block instruments, etc., immediately.

The signalman confirmed this evidence and said he was making train register entries when the stationmaster called out; he himself did not see the collision, but sent "obstruction danger" at once. He confirmed the positions of the signal and point levers, etc., as noted by the stationmaster. He said he should have had sufficient time to make the shunt without causing undue delay to the up train, because a 9-coach train would have cleared the up line within three minutes; the

scene and found all the signalling equipment to be in proper order; both distant and home signal arms were working freely and being correctly repeated. The signal inspector, off duty on July 4, heard of the accident in the evening; he went immediately to Maze Hill, made comprehensive tests and found everything in order.

An area maintenance assistant arrived within 40 min. and examined the controls in the motorman's cab. The master key and master switch both were "in" and the forward and reverse switch in the forward position. The master controller handle was in parallel, which would give approximately two-thirds power, and the dead man's handle had been releasd. The electro-pneumatic brake valve handle was about midway between release and full application positions. The master controller handle might have moved as a result of the collision, but he did not think a full Westinghouse application had been made because if it had he doubted if the brake handle would have moved back to the position in which he found it. Brake gear he found in very good order, with slack adjusters positioned correctly and brake blocks well bedded in. A few days later he tested the brakes of the three rear coaches; triple valves responded correctly and brake cylinder pressures were up to standard. He could not completely test the equipment on the leading coach, owing to

damage, but all undamaged parts were in good order. He had noticed a heavy burn on the conductor rail made by a short circuit from the rear shoe and from its position and other facts concluded that the electric train had moved forward 33 ft. after the collision.

The motorman said he got up at 3.30 a.m., had some breakfast at 3.45 and began duty at 4.28. At Slade Green, where he prepared two trains and left at 5.48 for Cannon Street. He took another thence to Hayes arriving at 7.0 and returned to Charing Cross, working back to Dartford by 8.45. There he had a cooked breakfast and took charge of the 9.41 train from Gravesend Central when it arrived at 9.57, with 10 coaches. He tested the electro-pneumatic brake and at Slade Green six coaches were detached. He again tested the e.p. brake and the guard tested the Westinghouse. They had a clear run to Charlton stopping at all stations. On leaving there he saw the Maze Hill distant signal to be against him. He remembered leaving Westcombe Park but had no recollection of seeing the home signal ahead; he shut of power at the overbridge and saw the engine shortly after. For a time he thought it was in the siding but on realising the situation applied the e.p. brake and released the dead man's handle. Remaining in the cab he had a remarkable escape, receiving only minor cuts and scratches.

The day before he had come off duty at 12.43 p.m. His home was near the Slade Green depot and he explained to Brigadier Langley what he did after reaching it. On early turn it was his usual routine to rest for three hours in the afternoon and then stay up for the evening until 10 or 10.30. He slept well and had nothing on his mind; he smoked a pipe but very rarely drank anything. He had never experienced his mind going blank or his memory failing him as on this occasion. On most evenings he watched television, but before then he had stayed up in the evenings on early turn. Ever since he started on the railway 17 years ago it had been his practice to have a broken 7-8 hr. in bed, part in the afternoon, the remainder at night.

The guard said he tested the brakes after the coaches were detached at Slade Green, the motorman making the e.p. test first. He noticed that the Maze Hill distant signal was at caution. They made the booked stop at Westcombe Park but instead of looking for the home signal he began making entries in his service book after leaving there. He thought they were running at normal speed and noticed no brake application. The district driving inspector, until recently for five years the motorman's foreman, said he was a very good man, very steady and a cautious driver. The foreman motorman, who had had this motorman under his charge for the last four years described him as quiet and carrying out his duties in a good manner. He considered him "a studious man driving a train" and said "he was very interested in his future from a foreman motorman's point of view" and was "always asking questions about working and maintenance."

Chief Inspecting Officer's Conclusions

Brigadier Langley is satisfied that all signals were properly against the electric train, the acceptance of which was in order, and that no defect existed in any item of equipment. Curvature obstructed the steam engine driver's view of the oncoming train; he could do no more than attempt to stop his own.

The motorman admitted seeing the distant signal at caution but could not recollect seeing the home signal. He carried on as if it was clear for him and made no attempt to stop until well past the overbridge when he realised that the engine was on the same line. His statement that he immediately braked and lifted the dead man's handle is accepted. This reduced speed from about 40 to about 25 m.p.h. He must accept full responsibility for the accident. He is 33 with a clear record through his 17 years' service, 9 years as motorman.

Medically examined at Brigadier Langley's request he was found to be well balanced and in good mental and physical health. A keen railwayman, his superiors speak very highly of him. Two years ago he was specially commended for vigilance and prompt action in preventing an accident to a passenger.

There was nothing to interfere with his view of this well sited signal; he assured Brigadier Langley that he was not feeling tired, although he had been six hours on duty, and had no worries on his mind. He had controlled the train properly hitherto but evidently failed to concentrate on his work as he was approaching the signal; he must have recovered by the time he reached the overbridge ahead of it as he acted promptly on seeing the obstruction.

The guard failed to keep a good lookout when leaving Westcombe Park; had he been doing his duty properly he would have had ample time to make an emergency brake application and to have stopped the train after it had overrun the signal. He must bear some measure of responsibility. Aged 38, he has been 22 years in the service, and a passenger guard for the last three years, with a clear record.

Remarks

Brigadier Langley feels unable to offer any satisfactory explanation of this motorman's lapse. Fortunately there were no serious casualties, but in view of the grave consequences which can arise from passing signals at danger the problem of reducing still further accidents from this cause, low though they be already, is being examined afresh. As pointed out in his Annual Report for 1957 (see our November 21, 1958, issue) the British Transport Commission intends to make a special investigation with the help of a panel of scientific experts.

(The motorman was tried on December 15 and 16 on a charge brought under the Offences Against the Person Act of 1861, of endangering the safety of passengers by wilfully neglecting to conform to signals, but was found "not guilty" and discharged.)

Coventry Station Reconstruction

Preliminary site work has begun in preparation for the reconstruction of Coventry Station, British Railways, London Midland Region. The station has been planned to provide proper segregation of passengers, parcels, and G.P.O. traffic. The basis of the plan is a projecting concourse, at right angles to the covered platforms, which splits the area in front of the station into two forecourts, the one to the left for parcels and mail and the other for passengers arriving by private car or taxi. The parcels forecourt is enclosed by the parcels office and staff accommodation, and the passenger forecourt by public rooms and a two-storey car park.

Car Parking Facilities

The car park will have access from the passenger forecourt and, at high level, from Warwick Road. Both levels are connected to the station by a covered way. Passengers arriving at the station by bus will be set down at a bus shelter at the end of the concourse, and will have direct covered access to all parts of the building. The traffic circulation and the relationship of the station buildings to the new square projected by Coventry Corporation have been planned in consultation with the City Architect and Planning Officer.

The concourse booking hall will contain the booking office, enquiry office, left luggage office, shops, telephone kiosks, and train indicators. On passing through the ticket barrier, passengers will either walk on to the up main platforms or cross by the bridge to the other three platforms. Parcels traffic is to be confined to a separate overbridge, with lifts, parallel to the passenger bridge, both bridges forming an extension of the concourse block.

The buildings facing on to the up platform comprise staff facilities on the parcels forecourt side and public rooms, including a waiting room and cafeteria, on the other. The waiting room cafeteria will overlook both the platform and the passenger forecourt, with a view of the square beyond. There will also be a waiting-refreshment room on the island platform.

Construction will start this year and completion is planned for the Spring of 1961. The station was designed by Mr. W. R. Headley, Regional Architect, under the direction of Mr. A. N. Butland, Chief Civil Engineer, London Midland Region.

Braking Tests with 3,300-h.p. Deltic Locomotive

A test run was carried out last week on the Great Northern Line of British Railways, Eastern Region, between Kings Cross and Grantham to check stopping distances under high-speed braking, and other performance characteristics with a 10-coach train hauled by the prototype English Electric 3,300-h.p. Co-Co diesel-electric Deltic locomotive equipped with twin 18-cylinder 2-stroke Napier Deltic engines. The train included the Eastern Region dynamometer car and weighed 355 tons behind the drawbar.

To make visual checks possible on the braking distances recorded, brakes were not applied until the locomotive was level with signal posts.

Stops from speeds of 60, 90, and 102 m.p.h. showed satisfactory results. From 90 m.p.h. on a falling gradient of 1 in 200, the braking distance to a stop was 5,064 ft., against 5,346 ft. from the same speed but on level track obtained during tests with a steam-hauled train.

The maximum speed reached was 106 m.p.h. The most notable performance, however, was the ascent to Stoke Summit on gradients as severe as 1 in 178. In the 16½ miles from Tallington to Stoke, no speed was recorded lower than 85 m.p.h. and maxima of 92 m.p.h. were recorded at Little Bytham and Corby Glen. The average speed over this stretch was 88 m.p.h.

Since being transferred from the London Midland Region, the prototype Deltic has been given route trials for some weeks on

daily scheduled services between London and Doncaster. Delivery will commence in 1960 of the 22 new locomotives of this type built by English Electric. These are intended for use on the East Coast main line between London and Edinburgh.

The special test run was arranged by Mr. G. F. Fiennes, Line Traffic Manager (Great Northern), Eastern Region, in collaboration with technical staff under the direction of Mr. K. J. Cook, Chief Mechanical & Electrical Engineer, Eastern Region.

Radio Telephones in Derby Locomotive Works

Radio telephones have been brought into use at Derby Locomotive Works, British Railways, London Midland Region, in connection with the reorganisation of the internal transport system, to eliminate some light running of tractors, trailer shortages, and other difficulties. The main features of the reorganisation were the census and classification of all trailers into type and number, and the establishment of definite routes for the majority of the tractors. The operation of these routes caters for a large majority of the transport requirements, but to still further improve control of the fleet of vehicles, radio telephones have been installed.

After a three-month trial period with equipment loaned by Pye of Nottingham, permanent equipment was ordered. It is of more recent design than that used during the trial and consists of a main control station which is located in the Transport Foreman's Office with a roof aerial, seven transmitter/receivers fitted to five tractors, a mobile crane, and a lorry; and a walkie-talkie type of set for miscellaneous use. An additional transmitter/receiver set is held in reserve.

Operation Procedure

The procedure followed is that a Shop Foreman, or his nominee, requiring urgent despatch of material, notifies the Transport Foreman, with position of the loaded trailer and its destination. The Transport Foreman, with his knowledge of the disposition of his tractors, contacts the radio-controlled vehicle nearest to the position reported, giving the driver instructions based on the information he has received. This means that the Transport Foreman has full knowledge and therefore better control of the current internal transport situation.

By asking drivers of the radio-telephone equipped tractors to pass on messages to any driver of the non-controlled tractors, the Transport Foreman has a line of communication to all members of his staff. Conversely, all drivers can contact their Foreman via the same channel to report on any situation such as direct requests for their assistance from depots which do not have a telephone or breakdowns and other difficulties associated with their movements.

Because of the reorganisation, including the installation of radio-control, it has been possible to reduce the tractor fleet making the internal road transport department a much more efficient unit.

DUNLOP RUBBER CO. LTD. NEW LONDON OFFICES.—A block of offices in the course of erection on the site of the old St. James's Theatre in King Street, London, S.W.1, is to be occupied by the Dunlop Rubber Co. Ltd. to provide more extensive head office accommodation.

Staff and Labour Matters

Railway Pay Review

The Investigating Officers appointed by the Railway Pay Committee of Inquiry have commenced their enquiries with a view to establishing job comparability between railway pay and the pay of staff in other nationalised industries, public services, and appropriate private undertakings.

The investigators are starting their enquiries at passenger stations where they will examine the work of both salaried and conciliation grades. The stations to be investigated range from a small station to a large London terminal and have been selected to give a representative cross-section of passenger work throughout the various Regions of British Railways.

After completing their investigations at passenger stations, the Committee of Inquiry will then turn its attention to other sections of railway work and to the task of comparing duties performed by railway staff with those of staff in outside industry.

Suggestions in regard to these features will be made to the Pay Committee by the Joint Advisory Committee comprising representatives of the British Transport Commission and the three railway trade unions, whose responsibility is to give guidance to the committee and to advise it of the lines on which it is to conduct the inquiry and the methods to be adopted in ascertaining the facts.

Claims for Higher Pay and Shorter Hours

Workers in the building industry, who are asking for an increase of 4d. an hr., have had their claim declined by employers.

Leaders of workers in the commercial printing and those employed on provincial newspapers are pressing for a 40-hr. week and a rise of approximately 2s. in the £.

A claim for reduction of hours from 47 to 44 per week has been made by the union leaders on behalf of agricultural workers.

Parliamentary Notes

Electricity Supplies for Railways

Lord Latham, in the Second Reading debate in the House of Lords on March 3 on the Electricity (Borrowing Powers) Bill, said that the nationalised industries had too much control; that many of those who are responsible for the conduct of these industries were bound, in coming to decisions, to be looking over their shoulders and trying to evaluate what might be said in one or other House of Parliament. Most of the charges made by the nationalised industries were subject to Ministerial control, so that the bodies concerned were responsible to Parliament.

In 1952, he added, when the B.T.C. had obtained authority to increase certain fares in London, and outside London on British Railways, the Government, through the Minister of Transport of the day, interfered and forebade the Commission to institute the proposed increases. As a result, London Transport lost £1¼ million of income for several years, and British Railways in the London area, lost an additional £660,000 a year. That loss went on for quite a number of years. The real reason for that interference was the fact that local government elections were taking place at that time, including those for the L.C.C.

Lord Ferrier urged that the electricity tariff for railway traction be cut to the lowest possible limit. He asked whether an off-peak element could be brought into bulk tariff for railways. Admittedly, the railway traction load today was only a small percentage of the total load, but this would grow. Railway electrification had a function over and above its purely railway value. It would mean work for a widely-spread range of electricity, and would relieve pressure on road traffic. The electricity authorities, by keeping the railway tariffs at rock bottom, could make a contribution out of all proportion to the actual cost to the nation. Adoption of the proposal would also mean more employment. More would have to spent on distribution now, when the expenditure on generation seemed to be in hand. In areas where unemployment was extensive, there were sites where steel could be fabricated and perhaps put aside, and stocks of gantries and similar repetitive steel equipment put together ready for electrification, whether it be power distribution under the Electricity Authority or of railway electrification under the railway authority. To electrify a railway meant extensive development of electricity distribution.

Lord Merrivale said that the B.T.C. had stated that when the full electrification plan was in full operation it would mean that the electricity mean load factor would be 53 per cent, while within certain areas of the scheme the load factor would reach the high figure of 70 per cent. On the question of direct current which could be stored, he would particularly commend the efforts of the Commission in so far as it was using battery-driven vehicles. This, he thought, was an important point for those batteries could be charged during a period of minimum demand. Much remained to be done, in battery design, to lower weight and reduce volume. He had in mind battery-operated railcars, which were so satisfactory and extensively used in Germany.

Lord Mills, Minister of Power, said that the supplies to the railways were given direct by the Generating Board. It was the duty of the B.T.C. to make its case with the Generating Board and to secure the tariff which best suited its purposes, provided that the Generating Board agreed that it was also a reasonable one. It was laid down in Section 28 (5) of the Act of 1957 that the terms and conditions on which electricity was supplied to railway undertakings must not result in a financial loss to the Board. The question of a subsidy was precluded.

Questions in Parliament

Railway Wagon Works Closure

Mr. G. M. Lawson (Motherwell—Lab.) asked the President of the Board of Trade on March 3 whether his attention had been drawn to the threatened closure of the railway wagon building firm of Hurst Nelson & Co. Ltd., Motherwell; and whether, in view of his policy of seeking to encourage expansion of employment in this area of more than 8 per cent. unemployment, he would take immediate steps to ensure that this long established firm, which formerly employed 600 workpeople, was not closed down.

Mr. John Rodgers, Parliamentary Secretary to the Board of Trade, in a written answer: Closure must depend on the commercial judgment of the management. Our Controller has done all he can to assist by advising the firm of all the sources known to him from which work might be available, but we have no powers to direct work to a particular firm.

Contracts and Tenders

Transmission line contract for British Insulated Callender's Construction Co. Ltd.

The Central Electricity Generating Board has awarded a contract to British Insulated Callender's Construction Co. Ltd. for the supply and installation of an overhead transmission line across the River Thames. It will be installed about eight miles down stream from the existing crossing at Dagenham, and is designed for a working voltage of 380,000 but will operate initially at 275,000 V. This scheme will form part of the British supergrid system and the crossing, which will be located at West Thurrock on the Essex bank, will enable a connection to be made to the Channel coast.

British Transport Commission, South Wales Docks, has placed the following contracts:—

F. Taylor & Sons (Manchester) Ltd.: supply of three 3-ton "Jumbo" mobile cranes, Swansea Docks

Wm. Adams & Company: construction of road base and tarmacadam suffacing at East Quay, North Dock, Newport.

British Railways, Eastern Region, has placed the following contracts:

Thomas Fletcher & Co. Ltd.: repairs to arches between Stepney East and Bromley, Bow Common Viaduct

Samuel Butler & Co. Ltd.: supply and delivery of steelwork for construction of superstructure for new underline bridges No. 49A between Sprotborough West Junction and Warmsworth Junction, and No. 79B between Edlington Halt and Black Carr West Junction

Kyle, Stewart (Contractors) Limited: alterations to buildings at Ipswich Motive Power Depot for diesel operation.

British Railways, North Eastern Region, has placed the following contracts:—

Dow-Mac (Products) Limited: supply of concrete bridge beams, bridge No. 15, Lofthouse Station

British Electrical Repairs Limited: rewinding 1,000 kW. rotary converter armature, North Tyneside electrified lines

Bray Construction Equipment Limited: one tractor shovel and attachments

O. Atkinson & Sons Ltd.: supply and erection of steel framed part sheeted building, Hull

Blackwood Hodge & Co. Ltd.: two Gradall multi-purpose construction machines with attachments.

British Railways, Scottish Region, has placed the following contracts:—

James Young (Contractors) Limited: reconstruction of Dyke Road overbridge, between Scotstounhill and Yoker High and reconstruction of superstructure of Renton Road overbridge, between Dalreoch and Cardross

James Miller & Partners Ltd.: renewal of superstructure of Henry Bell Street overbridge, Helensburgh, and raising of approach roads

Switchgear & Cowans Limited, erection contract for equipment in switching stations.

British Railways, Southern Region, has placed the following contracts:—

Taylor Woodrow Construction Limited: new office accommodation, Portsmouth Fratton

Burton Constructional Engineering Co. Ltd.: fabricated steelwork for new platform roofing, Dover Marine

U.S. Autowash Co. (London) Ltd.: provision of vehicle washing plant, Bricklayers Arms

Dexion Limited: provision of racking in bonded warehouses, Dover Marine

James Longley & Co. Ltd.: new staff accommodation, Victoria Station

John Mowlem & Co. Ltd.: widening of the line between Pluckley and Ashford, Kent

F. S. Faulkner & Sons Ltd.: new car park, Dorking North

Aubrey Watson Limited: reconstruction of platforms, Victoria Station.

Holoplast Limited has been awarded a contract for the supply of decorative laminated plastic for use in British Railways, Southern Region, Tavern cars now being remodelled and modernised.

The Special Register Information Service, Export Services Branch, Board of Trade, has received calls for tenders as follow:—

From South Africa:

10 sets of refrigeration equipment for the kitchen car larders and frozen food cabinets of 10 dining cars, in accordance with S.A.R. specifications Nos. PLP. 206/58 and 205/56 and annexures

9 capacity reducing equipments for above item as per paragraph 7, annexure "A" of S.A.R. specification No. PLP.205/56

Spares to comprise:—

(*a*) 1 condensing unit, complete with motor and starter

(*b*) 48 brushes for motor

(*c*) 12 complete sets of contacts for starter

(*d*) 6 pairs of bearings for motor

(*e*) 6 sets of closing coils for starter

(*f*) 2 seals for compressor.

The issuing authority is the Stores Department, South African Railways. Bids in sealed envelopes, endorsed "Tender No. C.7664: Refrigeration Equipment" should be addressed to the Chairman of the Tender Board, P.O. Box 7784, Johannesburg. The closing date is April 3, 1959. Local representation is essential. The Board of Trade reference is ESB/4816/59.

100,000 sawn and/or hewn hardwood sleepers 6 ft. 6 in. × 9 in. × 4½ in.

400,000 sawn and/or hewn hardwood sleepers 7 ft. × 10 in. × 5 in.

The issuing authority is the Stores Department, South African Railways. Bids in sealed envelopes, endorsed "Tender No. A.7722: Hardwood Sleepers" should be addressed to the Chairman of the Tender Board, P.O. Box 7784, Johannesburg. The closing date is March 26, 1959. Local representation is essential. The Board of Trade reference is ESB/5962/59.

From India:

3,121 cylinders of various types.

The issuing authority is the Director General of Supplies & Disposals. The tender No. is SR-2/RGC/Cylinder/4552/1959-60/II. Bids should be sent to the Director General of Supplies & Disposals, Shahjahan Road, New Delhi. The closing date is April 7, 1959. The Board of Trade reference is ESB/5857/59.

From Portuguese East Africa:

23 items of spares for locomotives including bogies, coupling bolts, coupling and piston rods, wheel and axle assemblies, tyres, tyre bands, draft gear, and so on.

The issuing authority is the Ports, Railways & Transport Department, Lourenço Marques. The tendor No. is 51/59. A provisional deposit of Esc:70,000 must be made by tenderers. The closing date is April 3, 1959. Local representation is essential. The Board of Trade reference is ESB/4495/59.

Further details regarding the above tender, together with photo-copies of tender documents, can be obtained from the Branch (Lacon House, Theobalds Road, W.C.1).

Notes and News

Locomotives for New Zealand.—The engines powering the British Thomson-Houston diesel-electric locomotives for New Zealand are Rolls-Royce six-cylinder units, not eight-cylinder as stated on page 263 of our last week's issue. The power and speed are as stated.

Punctuality of Scottish Region Assured Arrival Service.—Since inception by British Railways, Scottish Region, of its "assured arrival" service in April, 1958, more than 200,000 consignments have been handled without a failure. The service was first provided for goods train traffic from Glasgow to Aberdeen and Dundee and back, with guaranteed overnight transit in either direction. It was later extended to Inverness, Elgin, and Edinburgh.

National/McLaren Engine at Olympia.—At the Engineering & Marine Exhibition at Olympia on April 16-30, the Hawker Siddeley Group exhibits will include a National/McLaren LE diesel engine with a rail-traction rating of 200 b.h.p. at 1,800 r.p.m. This is a vertical four-stroke engine with six cylinders normally aspirated. Other products to be exhibited by Hawker Siddeley Group Companies include Bryce fuel injection pumps, nozzles, and speed-sensing governors.

Scottish Region Train Alterations.—During the period until May 3, whilst possession is required of Glasgow Central Station for re-signalling, certain expresses to and from the South via Carlisle, which normally start from or arrive at Glasgow Central, are being diverted to Buchanan Street and St. Enoch. Sunday services between Glasgow and Ardrossan, Largs, and Ayr, which in winter are diverted to and from Glasgow Central, have resumed their normal running to and from St. Enoch. Trains to and from Greenock and Gourock, which normally use the Central Station, now run temporarily to and from St. Enoch on Sundays. Buffet car facilities are now provided on the 6.20 a.m. from Aberdeen to Glasgow and the 2.15 p.m. (Saturdays excepted) and 12.15 p.m. (Saturdays only) from Glasgow

to Aberdeen. On Monday mornings the 4 a.m. postal train from Glasgow Central to Aberdeen starts from Buchanan Street at 4.7 a.m.

Dow & Wilson Change of Address.—The new address of Dow & Wilson, previously of 122, Victoria Street, London, S.W.1, is Suffolk House, Laurence Pountney Hill, London, E.C.4; tel.: Mincing Lane 6767/8.

Dunlop Film on Disc Brakes.—The value of disc brakes on heavy road vehicles is featured in a Dunlop film "The Power to Stop," produced by Ronald H. Riley in association with the Film Producers' Guild. This describes the development of disc brakes from their origins in the field of aviation to their subsequent development for use on heavy road vehicles and so on. The film runs for 21 min. It is available in 16 mm. size from the Dunlop Film Library at Wilton Crescent, Merton Park, S.W.19.

North Eastern Region Train Alterations.—From March 2 all the midday diesel trains between Middlesbrough, Guisborough, and Loftus have been withdrawn. The only trains still continuing to run on this line are at 6.45 and 9.15 a.m. and 5.35 p.m. from Middlesbrough to Loftus and at 7.46 and 10.18 a.m. and 7 p.m. from Loftus to Middlesbrough. Among other N.E. Region alterations, the Fridays only 5.15 p.m. from Richmond (5.55 p.m. from Darlington) to Glasgow, run chiefly for troops from Catterick Camp on weekend leave, has been withdrawn: the 10.50 p.m. on Sunday nights from Kings Cross to Newcastle also has been withdrawn.

Eastern Region Posters.—Two posters recently produced by British Railways, Eastern Region, are reproduced in the accompanying illustration. One, featuring Southend, is by R. M. Lander, and was reproduced by lithography in 12 colours by Jordison & Co. Ltd. The other is by W. M. Fryer, and is reminiscent of the famous G.N.R. poster ("Skegness is so bracing") of 1908, by John Hassall. The new poster was reproduced by photo-lithography in eight colours by Stafford & Co. Ltd. Other new posters are of Mablethorpe, by Tom Eckersley, reproduced by lithography in seven colours by R. B. Macmillan Limited; Great Yarmouth, by Bagley; and Gorleston, by Lola Fielding. The two last mentioned were reproduced by photo-lithography in six colours by Jordison & Co. Ltd.

Two of a series of resort posters produced by British Railways, Eastern Region

First Stage of London Trolleybus Conversion.—The first stage of the London Transport trolleybus conversion programme took effect on March 4 when three south and south-east London trolleybus services, Nos. 654, 696, and 698, were replaced by diesel buses.

Indian State Railways Reunion and Dinner, 1959.—The annual reunion tea and dinner of the Indian State Railways (India and Pakistan) will be held on June 12 at the Rembrandt Hotel, Thurloe Place, S.W.7. The chair at the dinner will be taken by Mr. Norman Calder, who has been Honorary Secretary of the Dinner Club for the past 21 years. The principal speaker will be Sir George Cuffe, a former General Manager of the Assam Bengal, Great Indian Peninsula, Bengal Assam, and Bombay Baroda & Central India Railways. Application for tickets should be made to Mr. N. Calder, 16, St. James's Square, London, S.W.1.

Reopening of Newhaven-Dieppe Passenger Service.—Daily passenger sailings between Newhaven and Dieppe are to be resumed by British Railways and the French National Railways on March 20. The service was suspended on November 4, 1958, as an economy measure because of lack of patronage during the winter months. It will be augmented by additional morning sailings from Newhaven on March 21, 25, and 28. Departure from Victoria will be at 8.52 a.m. and arrival in Paris St. Lazare at 6.4 p.m., in time to connect with principal international expresses from the Paris termini. Northbound, the boat train will leave Paris St. Lazare at 10 a.m. Two British ships, ss. *Brighton* and ss. *Londres*, both re-fitted and refurnished during the winter, sail on the route with two French ships, ss. *Arromanches* and ss. *Lisieux*. An excursion has been arranged via Newhaven and Dieppe for the international Rugby football match between Wales and France in Paris on April 3. The first no-passport day trip this year to Dieppe is on June 11.

Power Jacks Limited Change of Address.—The new address of Power Jacks Limited is Valetta Road, Acton, London, W.3. The company's manufacturing, engineering, accounts, and sales departments are now at this address.

Broom & Wade Limited in Belgium.—Broomwade-Belge S.A. has been formed to market the products of Broom & Wade Limited. The Directors are Mr. H. S. Broom, Mr. C. Broom Smith, and Mr. J. E. Bambrough. The office of the company is at 28, Rue des Ateliers, Molenbeek St. Jean, Brussels.

Special Train for Festiniog Railway Society Limited Meeting.—A special train will run from Paddington to Minffordd, British Railways, Western Region, on April 18, in connection with the annual general meeting of the Festiniog Railway Society Limited. It will return from Portmadoc to Paddington overnight to arrive on Sunday morning. The train will lease Paddington at 7.40 a.m.

Nuclear Power Station Transformer Consigned by Rail.—The first of six transformers manufactured by C. A. Parsons & Co. Ltd., Heaton, Newcastle-on-Tyne, arrived by rail at Southminster Station, British Railways, Eastern Region, on March 1, for delivery to Bradwell Nuclear Power Station. The out-of-gauge load, weighing 97 tons, was conveyed by special train from Heaton on a 92 ft. long transformer trolley wagon. The transformer was suspended on two 10-ton way beams, one at either side of the wagon, so that the base of the load cleared the track by 7 in. The wagon was marshalled between two empty rail wagons to spread the weight when passing over bridges. At Southminster the transformer was transferred to a British Transport Commission (Pickfords) road vehicle for delivery to the final destination.

British Standard for Isolators.—The new British Standard publication for isolators, including selectors, for alternating-current systems, B.S. 3078:1959, supersedes, in revised form, the last part of the 1937 edition of B.S. 116. It specifies the performance of a range of indoor and outdoor oil and air-break isolators. The voltage ratings extend from 415 V. to 275 kV., and the current ratings from 200-2,000 A. with provision for higher current ratings. The isolators are suitable for use at altitudes up to 3,300 ft. and in ambient temperatures not exceeding 40° C. The foreword draws attention to the fundamental difference between an isolator, which has no rated making or breaking capacity, a switch, and a circuit-breaker. Copies, price 12s. 6d., may be obtained from the British Standards Institution, 2, Park Street, London, W.1.

Wakefield-Dick Laboratories Extended.—The laboratories of Wakefield-Dick Industrial Oils Limited at Hayes, Middlesex, have been extended. The new spectrographic laboratory includes apparatus which analyses the metallic constituents of an oil sample. In the radio-chemical laboratory, research is conducted with the aid of radioactive isotopes. In the organic laboratory each chemist is provided with

separate compressed air, gas, vacuum, and nitrogen supply points, and a high velocity extraction system removes fumes at bench level. The new facilities are stated to be needed to deal with an increase of 300 per cent in the volume of research work during the past 10 years.

Forthcoming Meetings

March 18 (*Wed.*).—Institution of Locomotive Engineers, at the Institution of Mechanical Engineers, 1, Birdcage Walk, London, S.W.1, at 5.30 p.m. Annual General Meeting, followed by a paper on "The electrogyro locomotive," by Mr. T. E. Green, Chief Traction Engineer, and Mr. J. K. Gessler, Traction Engineer, National Coal Board.

March 18 (*Wed.*).—Railway Correspondence & Travel Society, West Riding Branch, at the Talbot Hotel, Bradford, at 7.30 p.m. Paper by Viscount Garnock on "Railroad operations on the North American Continent."

March 19 (*Thu.*).—Diesel Engineers' & Users' Association, at the Institute of Marine Engineers, The Memorial Building, 76, Mark Lane, London, E.C.3, at 2.30 p.m. Paper on "Development of the Vee-type engine," by Mr. G. Hopwood.

March 19 (*Thu.*).—British Railways, Western Region, London Lecture & Debating Society, in the Headquarters Staff Dining Club, Bishop's Bridge Road, Paddington, W.2, at 5.45 p.m. Young men's discussion—"The opportunities afforded youth in the railway service and how they could be enhanced," preceded by the Annual General Meeting.

March 20 (*Fri.*).—Institute of Transport, at the Dorchester Hotel, Park Lane, W.1. Annual dinner.

March 20 (*Fri.*).—Stephenson Locomotive Society, London & Southern Area, at Caxton Hall, Westminster, S.W.1, at 6.45 p.m. Paper on "The S.L.S. jubilee and locomotive memories of 1909," by Mr. F. C. Hambleton.

March 21 (*Sat.*).—Stephenson Locomotive Society, North Eastern Area, at the Griffin Hotel, Boar Lane, Leeds, at 6.30 p.m. Paper on "The West Highland Railway in North British days," by Mr. H. A. Vallance.

March 21 (*Sat.*).—Stephenson Locomotive Society, North Western Area, in the Conference Room, Liverpool Central Station, at 7.30 p.m. Paper on "The Leek & Manifold Railway," by Dr. J. R. Hollick.

March 21 (*Sat.*).—Permanent Way Institution, East Anglia Section, at Cambridge, at 2.15 p.m. Paper on "High speed turnouts and crossovers," illustrated, by Mr. W. A. C. White.

March 24 (*Tue.*).—The Railway Club, at 320, High Holborn, London, W.C.1, at 6.30 p.m. Informal meeting with talks by Mr. R. C. Riley and Mr. N. W. Spinks.

March 25 (*Wed.*).—British Railways, Southern Region, Lecture & Debating Society, at the Chapter House, St. Thomas' Street, London, S.E.1, at 5.45 for 6 p.m. Annual general meeting and reading of prize essay. Mr. C. P. Hopkins, President, in the chair.

March 25 (*Wed.*).—Railway Students' Association, at the London School of Economics & Political Science, Houghton Street, Aldwych, W.C.2, at 6.15 p.m. Paper on "R.S.A.—the first 50 years," by Mr. S. B. Taylor, Chief Secretary, British Transport Commission.

March 31 (*Tue.*)—Institution of Railway Signal Engineers, Bristol Section, at Chippenham, at 6 p.m. Paper on "Specification and inspection of signalling materials," by Mr. J. A. Heald, British Railways, Western Region.

March 31 (*Tue.*) to April 4 (*Sat.*).—Model Railway Club Exhibition, at the Central Hall, Westminster, S.W.1. Noon to 9.30 p.m. first day, remainder of week 10.30 a.m. to 9.30 p.m.

April 3 (*Fri.*).—The Railway Club, at the Royal Scottish Corporation, Fetter Lane, London, E.C.4, at 7 p.m. Paper on "The railways of Wales, 1899-1959," by Mr. D. G. M. Barrie.

April 3 (*Fri.*) to April 6 (*Mon.*).—Railway Students' Association Golden Jubilee Celebrations.

Railway Stock Market

There has been a good deal of hesitancy in stock markets with British Funds reflecting renewed doubts whether an early reduction in the bank rate is likely, and industrial shares unsettled by the sharp fall in earnings shown by some company results. On the other hand good features were not lacking. There are hopes that markets generally will become more cheerful with the approach of the Budget, which it is being confidently predicted in the City, will bring tax cuts designed to help industry and stimulate the home market.

Canadian Pacifics reflected the strength of Wall Street which was in evidence prior to the rise in the U.S. bank rate from 2½ per cent to 3 per cent, and at $57 compared with $54⅞ a week ago. The preference stock firmed up to 54, though the 4 per cent debentures eased fractionally to 65¼. White Pass shares were lower at $13¾.

Mexican Central "A" bearer debentures gained a point at 78, while elsewhere, United of Havana second income stock remained at 6 and the consolidated stock was 1. Brazilian Railway bonds were quoted at 5¾, San Paulo Railway 3s. units kept at 2s., and International of Central American connom shares were quoted at $24½. Costa Rica ordinary stock remained at 14, Paraguay Central prior debentures at 12½ and Chilean Northern first debentures at 54. Gedaref Railway & Development 5 per cent guaranteed debentures were 94, while elsewhere, Nyasaland Railways shares remained at the lower level of 13s. 6d. recorded a week ago, awaiting developments. The 3½ per cent debentures of the last-named company strengthened from 62 to 63. In other directions, West of India Portuguese capital stock remained firm at 104 with the 5 per cent debentures 1½ points higher than a week ago at 91½.

Among shares of engineering, locomotive and kindred companies Davies & Metcalfe 10s. shares rose from 17s. 6d. to 20s. on the raising of the distribution from 20 per cent to 22½ per cent including the special interim of 2½ per cent now announced. The higher distribution, which indicates confidence in the future, was covered 2½ times on the basis of the higher net profits for the past year.

Gloucester Wagon 10s. shares were 18s. 3d. and Wagon Repairs 5s. shares 10s., but North British Locomotive again receded, and were 10s. compared with 10s. 6d. a week ago. Westinghouse Brake at 43s. 6d. were within 3d. of a week ago, Beyer Peacock 5s. shares at 7s. 10½d. held fairly steady after their recent reaction, and Charles Roberts 5s. shares at 8s. 9d. were steadier awaiting further news about the Hurst Nelson situation. G. D. Peters kept steady at 26s. 3d. but Birmingham Wagon fell back from 18s. to 17s.

Associated Electrical were firm at 55s. 9d. in response to the good impression created by the higher profits; the maintained 15 per cent dividend was in accordance with expectations. English Electric held up at 65s. 6d., General Electric were 32s. and Crompton Parkinson 5s. shares 13s. 3d. The strong position disclosed by the accounts strengthened British Oxygen further to 53s. and a feature has been a good rally in Murex to 48s. 6d. Pressed Steel 5s. shares were well maintained at 24s. 4½d. Dowty Group 10s. shares were 40s. 3d. with the new shares at a premium of 4s. over the issue price of 36s. 6d. British Timken strengthened to 62s. Shares of the Hawker Group were 30s. 1½d., awaiting full terms of the coming offer to shareholders of £15,000,000 of convertible debentures.